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**From:** Timothy Browning  
**Sent:** Friday, June 25, 2010 10:43 PM  
**To:** Truedinger, Robert; thiessen.kenneth@deq.state.or.us  
**CC:** Sprick, Grant; Brent Jorgensen; Truedinger, Robert; Trewartha, Mark; Smith, Myron - Environmental:  
**Subject:** Willbridge Terminal Group 2nd QTR Meeting - Minutes and Updated Gantt Charts  
**Attachments:** Second Quarter 2010 Willbridge Terminal Group - Meeting Minutes final.doc; Chevron 2nd QTR 2010 update.mpp; Kinder Morgan 2nd QTR update.mpp; WTG Schedule - ConocoPhillips revised(06-15-10).pdf

Mike and Ken,

Here are the minutes and the schedule. Please review the minutes and add anything we may have missed.

Thanks,

Tim

Tim Browning, RG | Senior Manager | North American Operations  
Delta Consultants, an Oranjewoud N.V. Company  
Direct 503 863 2106 | Mobile 503 704 9617 | USA Toll Free 800 477 7411  
tbrowning@deltaenv.com <mailto:tbrowning@deltaenv.com> |  
www.deltaenv.com <<http://www.deltaenv.com/>>

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**COP0019886**



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## **Second Quarter 2010 Willbridge Terminal Group Meeting Minutes**

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**Date:** June 16, 2010

**Time:** 10:00 AM PST

**Location:** 4640 SW Macadam Avenue, Suite 110, Portland, Oregon

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**Attendees:**

Mike Romero, DEQ  
Ken Thiessen, DEQ  
Brett Hunter, Chevron  
Myron Smith, ConocoPhillips  
Rob Truedinger, Kinder Morgan  
Grant Sprick, ARCADIS  
Mark Trewartha, Stantec  
Tim Browning, Delta

**Coordinator Role Update - DEQ**

- DEQ has reviewed the Order along with the Department of Justice and concluded that the updated WTG coordinator role (as discussed in the 1<sup>st</sup> QTR meeting and summarized by Arcadis in the March 25, 2010 email) poses no problems relative to enforcement of the Order. As such no changes to the Order are needed and no further action is required.

**Portland Harbor Source Control Update - DEQ**

- DEQ is still working toward source control work addressed by late 2012 ROD
- KM requested the DEQ's perspective on maintenance dredging of Willamette River sediment and how that relates to the upland source control evaluations. DEQ responded that the dredging may provide a good opportunity to collect data that may support upland source control evaluations, particularly relative to past impacts to river sediment.
- Chevron requested the DEQ perspective on the Overwater Migration pathway. Arcadis clarified that AOPC 14 is not a complete pathway as it only relates to Saltzman Creek, but AOPC 16 (near the Willbridge Bulk Facility) would be a DEQ high priority level pathway since the facilities operate overwater docks. The DEQ mentioned that there is not an ongoing industrial process over the water and therefore likely not a high priority. The only potential pathway to the river would be releases during petroleum transfer operations and this pathway evaluation could be addressed using a weight-of-evidence argument

that there is not a complete pathway due to BMP measures and spill containment plans.

- DEQ does not expect a workplan to address the overwater pathway evaluation. Each WTG facility would be responsible to summarize their specific BMPs and spill plans for dock petroleum transfers to address this source control pathway.
- DEQ mentioned that the MCLs are still an ARAR.

#### **Risk Assessment Update - ALL**

- WTG is still on schedule to provide a scoping outline to the DEQ by August 5, 2010. The scoping outline will be for updating both the Human Health and Ecological risk assessments.

#### **Paramount Well Update – DEQ**

- DEQ indicated that nothing more is needed. The statement by Paramount on how the water is used in the industrial process shows no loss of beneficial use.

#### **Storm Water Source Control Update**

- Chevron – on schedule, report this month. BMPs are the primary source control measure coupled with system upgrades near outfall 2.
- ConocoPhillips – on schedule for report in October. All 4 quarters of data have been collected. Outstanding issue related to storm manhole near RR tracks apparently controlled by ODOT. DEQ can help with access if needed. DEQ requested that ConocoPhillips supply the storm water data as soon as it is ready and not wait until the final source control report. DEQ will submit to Stantec the table format for submittal of the data.
- Kinder Morgan - on schedule, work plan addendum supplied to the DEQ on June 8<sup>th</sup>. DEQ has not completed the review.

#### **Groundwater Source Control Update**

- Chevron – Meeting with DEQ on July 7<sup>th</sup> to discuss the updates.
- Kinder Morgan – on schedule to prepare workplan to address final weight-of-evidence evaluation.

#### **Chevron Terminal Projects Update**

- NW Doane Avenue Storm Sewer – DEQ will provide approval of the work plan.
- GWET System redesign – in process, working through final location and permitting process.
- Ethanol Spill Evaluation – Meeting with DEQ on July 7<sup>th</sup> to discuss.
- Enhanced Bio Pilot Study – 1<sup>st</sup> round of injections completed with second round scheduled for 2<sup>nd</sup> week in July.

#### **ConocoPhillips Terminal Projects Update**

- Fire Building Construction – nothing new

- Asphalt Maintenance and Soil Sampling Plan – Plan in place. Additional soil sampling will be conducted during future planned asphalt maintenance/replacement activities.
- Leaking Valve Near Shore Release – 5 to 10 gallons released, Stantec managed the removal and disposal of impacted material along with collecting confirmatory soil samples. Report pending.

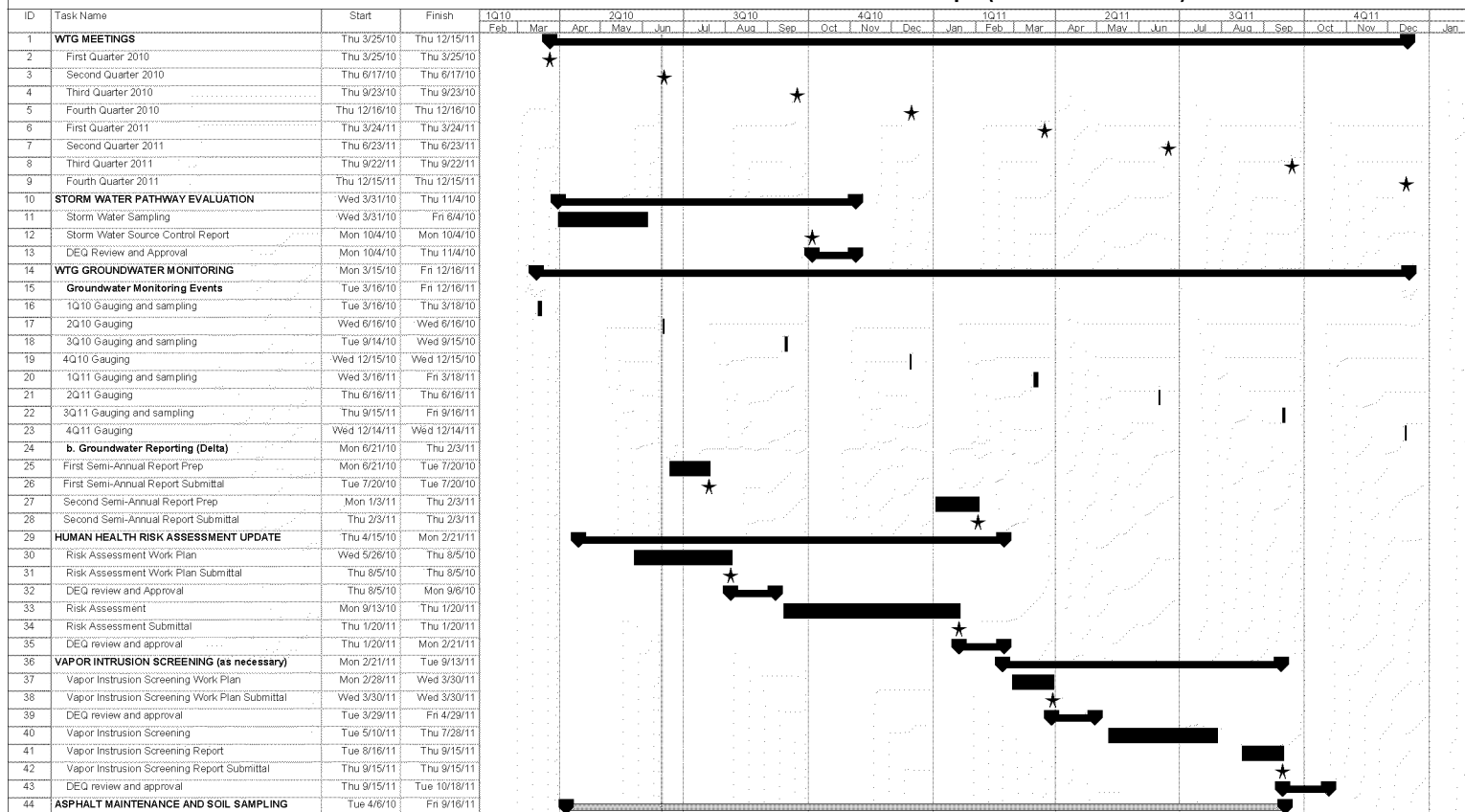
#### **Kinder Morgan Terminal Projects Update**

- Saltzman Creek – DEQ supplied KM (via email) the general scope of work the DEQ is proposing to evaluate Saltzman Creek. KM will review relative to the portion of Saltzman Creek through KM property and prepare a sampling scope to evaluate potential impacts to the Creek from KM.
- Tank 4 DDT Work Plan – workplan in preparation. DEQ requested that KM provide the DDT sampling history and results in the work plan.
- Certain Teed Property Line Assessment – workplan in preparation. DEQ recommended KM review the DEQ files, sample suspect wells and complete hydrocarbon fingerprinting to evaluate if petroleum from KM is migrating to Certain Teed property.
- Willamette Seep Assessment – workplan in preparation. One seep located near the KM Chevron property line contains PAHs above SLVs. Chevron is not planning any additional groundwater assessment in the area and there is no groundwater contamination related to the nearby former recovery trench. KM will prepare a work plan considering nearby well screen elevations and collecting additional on site soil and groundwater data to evaluate the source of the PAHs.

#### **Miscellaneous**

- Chevron is waiting for a biological opinion on proposed dredging from NOAA.

# WILLBRIDGE TERMINAL GROUP SCHEDULE - ConocoPhillips (Revised 06-15-10)



Project: WTG  
Date: Tue 6/15/10

Task   
Split .....

Progress   
Milestone ◆

Summary   
Project Summary

External Tasks   
External Milestone ◆

Deadline ↓

## **Second Quarter 2010 Willbridge Terminal Group Meeting Minutes**

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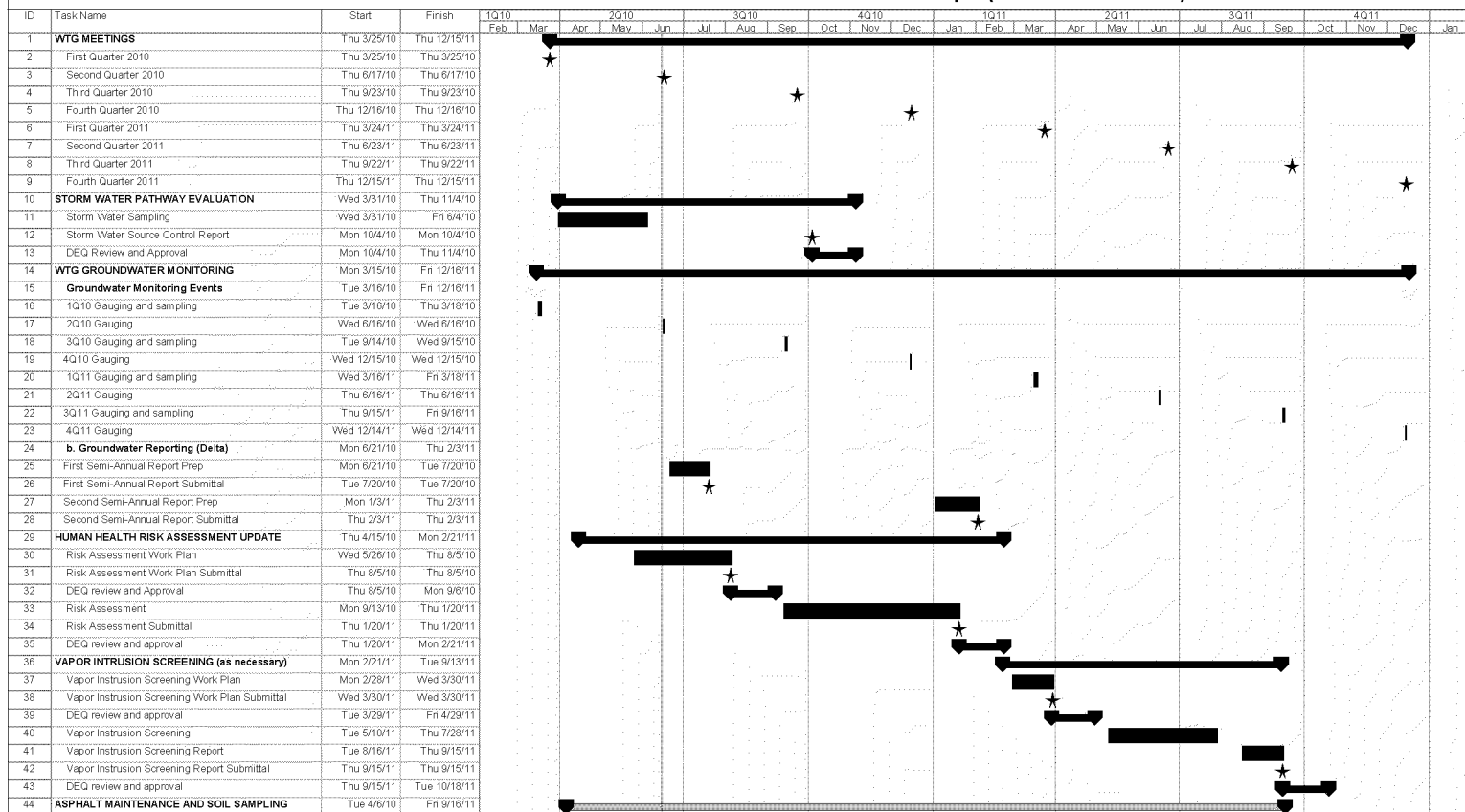
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#### **Miscellaneous**

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# WILLBRIDGE TERMINAL GROUP SCHEDULE - ConocoPhillips (Revised 06-15-10)



Project: WTG  
 Date: Tue 6/15/10

Task:    
 Split: .....

Progress:  Summary  
 Milestone:  Project Summary

External Tasks:  External Tasks  
 External Milestone:  External Milestone

Deadline:

---

**From:** Trewartha, Mark  
**Sent:** Thursday, February 10, 2011 04:57 PM  
**To:** Mozart, Angie (PTS Staffing Solutions)  
**CC:** Peterson, Marc; Solomon, Rich; Hetrick, Eric G  
**Subject:** FW: Fax  
**Attachments:** 2011\_02\_08\_12\_06\_20.pdf

Angie,

I received this fax from BNSF.

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
Fx: (503) 297-5429  
Cell: (503) 807-8568

<<http://www.stantec.com>> stantec.com

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From: Butler, Nicole  
Sent: Tuesday, February 08, 2011 12:07 PM  
To: Trewartha, Mark  
Subject: Fax

Mark,

Attached is a fax that was just received for you.

Thank you,

**COP0020101**

Nicole Butler  
Administrative Assistant  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631  
Fx: (503) 297-5429  
Nicole.Butler@Stantec.com

<<http://www.stantec.com>> stantec.com

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**COP0020102**



BNSF Railway Company  
Insurance Compliance  
P.O. Box 12010 - BN  
Hemet, CA 92546-8010

P 3032975429

FEBRUARY 08, 2011

ID Number: 10-41597-0  
V296-License-Environmental Access-427012005

Stantec Consulting Corp.  
Mark Trewartha  
9400 Sw Barnes Road, Suite 200  
Portland, OR 97225

Project Location: City: Portland  
State: OR

### **FINAL NOTICE**

#### **SUBJECT: NEW CONTRACT - INSURANCE COVERAGE REQUEST**

We would like to take this opportunity to remind you that our contract states that you must be continuously insured while doing business with BNSF Railway Company. As of the date of this notice, we do not have record of your current insurance information in our files.

It is not necessary to call us. A complete listing of our insurance requirements is shown on the second page of this document. Please discuss this matter with your insurance agent and have them immediately fax a new Certificate of Insurance showing all the required coverages and endorsements to the fax number shown below. If you have questions about this letter or the correct coverages required you may call us at (951) 766-2221.

To avoid possible suspension of your activities with BNSF Railway Company, your new insurance coverage information must be faxed to us within 7 days of the date of this letter.

Sincerely,

Insurance Audit Department

**Please issue certificates for 'any and all contracts.'**  
**Fax your insurance information ONLY to (951) 652-2882.**

BN PNS - 01/04

COP0020103

Contractor Minimum Insurance Requirements

427012005

The Certificate must:

- \* Be an original document - **Binders are not acceptable.**
- \* List all subsidiaries or DBA's covered by the certificate provided.
- \* Provide at least 30 days notice of cancellation.
- \* Show complete insurance carrier names as listed in the A.M. Best Property & Casualty Guide.
- \* All Coverages must be placed with carriers rated not less than A-, VII by A. M. Best & Co.
- \* Include a 3 year tail option on all 'Claims Made' coverages.
- \* Be completed in its entirety and signed.

**Required Cancellation Clause Modification**

The certificate must show 30 days notice of cancellation. The words ' ENDEAVOR TO' and 'BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES' must be removed from the cancellation clause.

**Required Additional Insured Wording**

BNSF Railway and Jones, Lang, Lasalle Global Services must be correctly named as an Additional Insured for Auto and General Liability (per Endorsement 'CG 20 10' 07-04 for GL).

**Primary Coverage**

Any coverage afforded BNSF Railway and Jones, Lang, Lasalle Global Services , the Certificate Holder, as an Additional Insured shall apply as primary and not excess to any insurance issued in the name of BNSF Railway and Jones, Lang, Lasalle Global Services.

**Waiver Of Subrogation:**

The policies must include a specific Waiver of Subrogation rights against BNSF Railway Company.

**COMMERCIAL GENERAL LIABILITY (Occurrence Form) \*:**

Coverage must be endorsed to cover incidents that occur within 50 feet of railroad property. Coverage must specifically reflect that the definition for insured contract has been amended to eliminate the restriction.

\$4,000,000 General Aggregate  
\$2,000,000 Each Occurrence

**COMMERCIAL AUTOMOBILE LIABILITY COVERAGE:**

Must indicate coverage for Any Auto or Owned, Hired or Borrowed, and Non-owned Vehicles

\$1,000,000 Combined Single Limit

**RAILROAD PROTECTIVE COVERAGE:**

\$6,000,000 General Aggregate  
\$2,000,000 Each Occurrence

**WORKERS' COMPENSATION AND EMPLOYERS LIABILITY COVERAGE:**

Statutory Workers' Compensation Insurance

**POLLUTION LIABILITY COVERAGE:**

\$10,000,000 Aggregate  
\$5,000,000 Each Occurrence

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**From:** Morrow, Bonnie (PTS Staffing Solutions)  
**Sent:** Wednesday, January 19, 2011 11:24 PM  
**To:** Mozart, Angie (PTS Staffing Solutions)  
**Subject:** FW: NEW BNSF PROJECT  
**Importance:** High  
**Attachments:** Environmental Access Permit 10-41597.pdf

The Agreement.

Bonnie Morrow

Bonnie Morrow, Contracts Associate

Principal Technical Services-Approved Service Provider for

ConocoPhillips Co., Corporate Real Estate - Property Tax,

Real Estate, Right of Way & Claims

1232 Park Street, Suite 300

Paso Robles, CA 93446

Phone: (805) 226-2647

Email: bonnie.morrow@contractor.conocophillips.com

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**From:** Hagemann, Colleen S.  
**Sent:** Wednesday, January 19, 2011 12:52 PM  
**To:** Morrow, Bonnie (PTS Staffing Solutions)  
**Subject:** FW: NEW BNSF PROJECT  
**Importance:** High

Hi Bonnie,

Here is the permit we are processing for Mark Trewartha and Rich Solomon. I don't think I received a PRF for this, but will check and assign to you, if so.

Best Regards,

Colleen

Colleen Hagemann  
ConocoPhillips Company  
Western Region - PTRRC  
Phone: 805.226.2649  
Cell #: 805.405.3706

COP0020105

From: Trewartha, Mark [mailto:Mark.Trewartha@stantec.com]  
Sent: Tuesday, December 14, 2010 10:26 AM  
To: Hagemann, Colleen S.  
Subject: RE: test

Can you hear me now....

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
Fx: (503) 297-5429  
Cell: (503) 807-8568

<<http://www.stantec.com>> stantec.com

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\* Avant d'imprimer ce courriel, réfléchissez à l'impact sur l'environnement.

From: Hagemann, Colleen S. [mailto:Colleen.S.Hagemann@conocophillips.com]  
Sent: Tuesday, December 14, 2010 10:24 AM  
To: Trewartha, Mark  
Subject: test

Thank you,

Colleen

Colleen Hagemann, Contracts Associate  
ConocoPhillips Co., Corporate Real Estate,  
Property Tax, Real Estate, Right of Way & Claims  
1232 Park Street, Suite 300  
Paso Robles, CA 93422  
Phone: 805.226.2649  
Cell : 805.405.3706  
Fax : 805.239.4410

-----  
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**COP0020106**



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Thank you.

\*\*\* NOTE: THIS AGREEMENT IS PENDING BNSF OPERATING APPROVAL AND CANNOT BE  
FINALIZED UNTIL WE RECEIVE THEIR APPROVAL. \*\*\*

December 7, 2010

10-41597

Mark Trewartha  
Sr. Hydrogeologist  
Stantec Consulting Corp.  
9400 S.W. Barnes Rd., Suite 200  
Portland, OR 97225

Dear Mr. Trewartha:

Enclosed please find duplicate counterparts of the requested contract for execution by an official authorized to execute contract agreements on behalf of Stantec Consulting Corp. Please execute and **return both copies with original signatures** for completion on part of BNSF Railway Company ("BNSF") to this office.

**You should have been or will be contacted by IDS, the BNSF's Insurance Tracking Company. If you have not, and you have any questions regarding any of the insurance requirements, please contact Aimee Austin, via fax, at 951-652-2882. If you have not done so, please fax the following insurance documents to Ms. Austin:**

1. A Certificate of Insurance as required in the agreement.
2. A **separate policy** for Railroad Protective Liability Insurance as required in the agreement (**ORIGINAL POLICY MUST BE PROVIDED**). BNSF Railway Company will be the only insured party; OR;

**In lieu of providing a separate policy for Railroad Protective Liability Insurance**, you may participate in the BNSF's Railroad Protective Policy by checking the appropriate box in the contract and including an additional \$500.00 with your check.

Acceptance and deposit of any check by BNSF does not constitute an agreement between BNSF and Licensee for the requested license. BNSF shall not be obligated to hold the check in a separate fund, but may commingle the funds with other funds of BNSF, and in no event shall BNSF be responsible for interest on said funds.

The enclosed permit is not a binding agreement and shall become binding only when, and if, it is executed by you and fully approved and executed by BNSF Railway Company. Upon completion on behalf of BNSF, one fully executed counterpart will be returned for your records.

Please be informed that if contracts, fees, and insurance are not returned within sixty (60) days, a \$600.00 processing fee will be assessed.

Sincerely,



Heather Calhoun  
Sr. Contract Specialist

Enclosures

COP0020108

## LICENSE FOR ENVIRONMENTAL ACCESS

**THIS LICENSE** ("License"), made as of the \_\_\_\_\_ day of \_\_\_\_\_, 2010 ("Effective Date") by and between **BNSF RAILWAY COMPANY**, a Delaware corporation ("Licensor") and **STANTEC CONSULTING CORP.**, a Delaware corporation ("Licensee").

**NOW THEREFORE**, in consideration of the mutual covenants contained herein, the parties agree to the following:

### GENERAL

1. Licensor hereby grants Licensee a non-exclusive license, subject to all rights, interests, and estates of third parties, including, without limitation, any leases, licenses, easements, liens or other encumbrances, and upon the terms and conditions set forth below, to use the area of Licensor's property shown on the attached Drawing No. 1-50309, dated October 20, 2010 and revised December 3, 2010, attached hereto, marked Exhibit "A", and made a part hereof, situated at or near Portland, County of Multnomah, State of Oregon, Line Segment 0047, Mile Post 3.86 ("Premises") for the purposes specified in Section 3 below.
2. Licensee shall not disturb any improvements of Licensor or Licensor's existing lessees, licensees, easement beneficiaries or lien holders, if any, or interfere with the use of such improvements.
3. Licensee shall use Premises exclusively as a site for performing environmental and engineering explorations to include one of, or a combination of, the following categories of work:
  - (a) Drilling of soil test borings;
  - (b) Installation of groundwater monitoring wells;
  - (c) Performing groundwater inflow tests on wells;
  - (d) Obtaining groundwater samples from wells;
  - (e) Maintenance and/or checking groundwater level in wells approximately one time per month;
  - (f) Performance of any necessary remediation as determined by Licensor in its sole discretion or by applicable state and/ or federal regulations at Licensee's sole cost and expense. In the event applicable state and/or federal regulations require that the Premises be remediated, Licensee will obtain a No Further Action Letter, Release, or other such equivalent closure document from the state or federal agency having jurisdiction over the remediation of the Premises. Such No Further Action Letter, Release, or other such equivalent closure document shall not be contingent upon or specify the performance of any further work or conditions with respect to the Premises. Licensee warrants that it will conduct quarterly storm water sampling and monitor a manhole to test for petroleum related constituents. Licensee shall not use the Premises for any other purpose whatsoever. Licensee shall not use or store hazardous substances, as defined by the Comprehensive Environmental Response, Compensation, and Liability Act, as amended ("CERCLA") or petroleum or oil as defined by applicable Environmental Laws on the Premises.

4. In case of the eviction of Licensee by anyone owning or claiming title to or any interest in the Premises, Licensors shall not be liable to refund Licensee any compensation paid hereunder or for any damage Licensee sustains in connection therewith.
5. Any contractors or subcontractors performing work on the Premises, or entering the Premises on behalf of Licensee, shall be deemed agents of Licensee for purposes of this License.

### **TERM**

6. This License shall commence on the Effective Date and shall continue for a period of two (2) years, subject to prior termination as hereinafter described.

### **COMPENSATION**

7. (a) The fee for this License has been waived.
- (b) Licensee agrees to reimburse Licensors (within thirty (30) days after receipt of bills therefor) for all costs and expenses incurred by Licensors in connection with Licensee's use of the Premises, including but not limited to the furnishing of Licensors' Flagman and any vehicle rental costs incurred. The cost of flagger services provided by the Railway, when deemed necessary by the Railway's representative, will be borne by the Licensee. The estimated cost for one (1) flagger is \$800.00 for an eight (8) hour basic day with time and one-half or double time for overtime, rest days and holidays. The estimated cost for each flagger includes vacation allowance, paid holidays, Railway and unemployment insurance, public liability and property damage insurance, health and welfare benefits, transportation, meals, lodging and supervision. Negotiations for Railway labor or collective bargaining agreements and rate changes authorized by appropriate Federal authorities may increase actual or estimated flagging rates. The flagging rate in effect at the time of performance by the Contractor hereunder will be used to calculate the actual costs of flagging pursuant to this paragraph.
- (c) All invoices are due thirty (30) days after the date of invoice. In the event that Licensee shall fail to pay any monies due to Licensors within thirty (30) days after the invoice date, then Licensee shall pay interest on such unpaid sum from thirty (30) days after its invoice date to the date of payment by Licensee at an annual rate equal to (i) the greater of (a) for the period January 1 through June 30, the prime rate last published in *The Wall Street Journal* in the preceding December plus two and one-half percent (2 1/2%), and for the period July 1 through December 31, the prime rate last published in *The Wall Street Journal* in the preceding June plus two and one-half percent (2 1/2%), or (b) twelve percent (12%), or (ii) the maximum rate permitted by law, whichever is less.

**COMPLIANCE WITH LAWS**

8. (a) Licensee shall observe and comply with any and all laws, statutes, regulations, ordinances, orders, covenants, restrictions, or decisions of any court of competent jurisdiction ("Legal Requirements") relating to the use of the Premises.
- (b) Prior to entering the Premises, Licensee shall and shall cause its contractor to comply with all Licensors' applicable safety rules and regulations. Prior to commencing any work on the Premises, Licensee shall complete and shall require its contractor to complete the safety-training program at the following Internet Website "<http://contractororientation.com>". This training must be completed no more than one year in advance of Licensee's entry on the Premises.

**DEFINITION OF COST AND EXPENSE**

9. For the purpose of this License, "cost" or "costs" "expense" or "expenses" includes, but is not limited to, actual labor and material costs including all assignable additives, and material and supply costs at current value where used.

**RIGHT OF LICENSOR TO USE**

10. Licensor excepts and reserves the right, to be exercised by Licensor and any other parties who may obtain written permission or authority from Licensor:
- (a) to maintain, renew, use, operate, change, modify and relocate any existing pipe, power, communication lines and appurtenances and other facilities or structures of like character upon, over, under or across the Premises;
- (b) to construct, maintain, renew, use, operate, change, modify and relocate any tracks or additional facilities or structures upon, over, under or across the Premises; or
- (c) to use the Premises in any manner as the Licensor in its sole discretion deems appropriate, provided Licensor uses all commercially reasonable efforts to avoid material interference with the use of the Premises by Licensee for the purpose specified in Section 3 above.

**LICENSEE'S OPERATIONS**

11. (a) Licensee shall notify Licensor's Roadmaster at 1515 W. 39<sup>th</sup> St., Vancouver, Washington 98660, telephone (360) 418-6324 or cell (360) 772-3353, and Licensor's Remediation Manager at 2454 Occidental Ave., 1A, Seattle, Washington 98134, telephone (206) 625-6376, at least ten (10) business days prior to entering the Premises. After completion of use of the Premises for the purpose specified in Section 3, Licensee shall notify Licensor in writing that such use has been completed.

- (b) In performing the work described in Section 3, Licensee shall use only public roadways to cross from one side of Licensor's tracks to the other.
  - (c) Prior to the commencement of any work, Licensee shall submit a workplan to Licensor's Remediation Manager at 2454 Occidental Ave., 1A, Seattle, Washington 98134, telephone (206) 625-6376, for Licensor's review. No work, as set forth in Section 3, may be conducted by Licensee without Licensor's written consent of said workplan for the purpose specified in Section 3. Such review and consent by Licensor shall not constitute the sufficiency or effectiveness of any workplan.
  - (d) No monitoring wells may be installed on the property prior to written approval of Licensee's workplan for the installation of such monitoring wells. Upon obtaining such consent, Licensee shall provide Licensor the location of said well(s) relative to Licensor's nearest trackage, identifying Licensor's nearest Mile Post sign number.
12. Under no conditions shall Licensee be permitted to conduct any tests, investigations or any other activity using mechanized equipment and/or machinery, or place or store any mechanized equipment, tools or other materials, within twenty-five (25) feet of the centerline of any railroad track on the Premises unless Licensee has obtained prior written approval from Licensor. Licensee shall, at its sole cost and expense, perform all activities on and about the Premises in such a manner as not at any time to be a source of danger to or interference with the existence or use of present or future tracks, roadbed or property of Licensor, or the safe operation and activities of Licensor. If ordered to cease using the Premises at any time by Licensor's personnel due to any hazardous condition, Licensee shall immediately do so. Notwithstanding the foregoing right of Licensor, the parties agree that Licensor has no duty or obligation to monitor Licensee's use of the Premises to determine the safe nature thereof, it being solely Licensee's responsibility to ensure that Licensee's use of the Premises is safe. Neither the exercise nor the failure by Licensor to exercise any rights granted in this Section will alter the liability allocation provided by this License.
13. (a) Licensee shall explore the proposed location for such work with hand tools to a depth of at least three (3) feet below the surface of the ground to determine whether pipelines or other structures exist below the surface, provided, however, that in lieu of the foregoing, the Licensee shall have the right to use suitable detection equipment or other generally accepted industry practice (e.g., consulting with the Underground Services Association) to determine the existence or location of pipelines and other subsurface structures prior to drilling or excavating with mechanized equipment. Upon Licensee's written request, which shall be made thirty (30) business days in advance of Licensee's requested entry on the Premises, Licensor will provide Licensee any information that Licensor's Engineering Department has in its possession concerning the existence and approximate location of Licensor's underground utilities and pipelines on the Premises. Prior to conducting any such boring work, the Licensee will review all such material. Licensor does not warrant the accuracy or completeness of information relating to subsurface conditions and Licensee's operations will be subject at all times to the liability provisions herein.

- (b) For all bores greater than 26-inch diameter and at a depth less than 10.0 feet below bottom of rail, a soil investigation will need to be performed by the Licensee and reviewed by Licensor prior to construction. This study is to determine if granular material is present, and to prevent subsidence during the installation process. If the investigation determines in Licensor's reasonable opinion that granular material is present, Licensor may select a new location for Licensee's use, or may require Licensee to furnish for Licensor's review and approval, in its sole discretion a remedial plan to deal with the granular material. Once Licensor has approved any such remedial plan in writing, Licensee shall, at its sole cost and expense, carry out the approved plan in accordance with all terms thereof and hereof.
- 14. Any open hole, boring or well constructed upon Premises by Licensee shall be safely covered and secured at all times when Licensee is not working in the actual vicinity thereof. Following completion of that portion of the work, all holes or borings constructed on the Premises by Licensee shall be:
  - (a) filled in to surrounding ground level with compacted bentonite grout; or
  - (b) otherwise secured or retired in accordance with any applicable Legal Requirement. No excavated materials may remain on the Premises for more than ten (10) days, but must be properly disposed of by Licensee in accordance with applicable Legal Requirements.
- 15. Upon completion of Licensee's work on the Premises or upon termination of this License, whichever shall occur first, Licensee shall, at its sole cost and expense:
  - (a) remove all of its equipment from the Premises;
  - (b) report and restore any damage to the Premises arising from, growing out of, or connected with Licensee's use of the Premises;
  - (c) remedy any unsafe conditions on the Premises created or aggravated by Licensee; and
  - (d) perform any other work to restore the Premises to a useable condition as deemed necessary in Licensor's sole discretion.
- 16. Licensee's on-site supervision shall retain/maintain a fully-executed copy of this License at all times while on the Premises.

### **LIABILITY**

- 17. (a) **TO THE FULLEST EXTENT PERMITTED BY LAW, LICENSEE SHALL RELEASE, INDEMNIFY, DEFEND AND HOLD HARMLESS LICENSOR AND LICENSOR'S AFFILIATED COMPANIES, PARTNERS, SUCCESSORS, ASSIGNS, LEGAL REPRESENTATIVES, OFFICERS, DIRECTORS, SHAREHOLDERS, EMPLOYEES AND AGENTS (COLLECTIVELY, "INDEMNITEES") FOR, FROM AND AGAINST ANY AND ALL CLAIMS, LIABILITIES, FINES, PENALTIES, COSTS, DAMAGES, LOSSES, LIENS,**

**CAUSES OF ACTION, SUITS, DEMANDS, JUDGMENTS AND EXPENSES (INCLUDING, WITHOUT LIMITATION, COURT COSTS, ATTORNEYS' FEES AND COSTS OF INVESTIGATION, REMOVAL AND REMEDIATION AND GOVERNMENTAL OVERSIGHT COSTS) ENVIRONMENTAL OR OTHERWISE (COLLECTIVELY "LIABILITIES") OF ANY NATURE, KIND OR DESCRIPTION OF ANY PERSON OR ENTITY DIRECTLY OR INDIRECTLY ARISING OUT OF, RESULTING FROM OR RELATED TO (IN WHOLE OR IN PART):**

**(i) THIS LICENSE, INCLUDING, WITHOUT LIMITATION, ITS ENVIRONMENTAL PROVISIONS,**

**(ii) ANY RIGHTS OR INTERESTS GRANTED PURSUANT TO THIS LICENSE,**

**(iii) LICENSEE'S OCCUPATION AND USE OF THE PREMISES,**

**(iv) THE ENVIRONMENTAL CONDITION AND STATUS OF THE PREMISES CAUSED BY OR CONTRIBUTED BY LICENSEE, OR**

**(v) ANY ACT OR OMISSION OF LICENSEE OR LICENSEE'S OFFICERS, AGENTS, INVITEES, EMPLOYEES, OR CONTRACTORS, OR ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM, OR ANYONE THEY CONTROL OR EXERCISE CONTROL OVER,**

**EVEN IF SUCH LIABILITIES ARISE FROM OR ARE ATTRIBUTED TO, IN WHOLE OR IN PART, ANY NEGLIGENCE OF ANY INDEMNITEE. THE ONLY LIABILITIES WITH RESPECT TO WHICH LICENSEE'S OBLIGATION TO INDEMNIFY THE INDEMNITEES DOES NOT APPLY ARE LIABILITIES TO THE EXTENT PROXIMATELY CAUSED BY THE GROSS NEGLIGENCE OR WILLFUL MISCONDUCT OF AN INDEMNITEE.**

**(b) FURTHER, TO THE FULLEST EXTENT PERMITTED BY LAW, NOTWITHSTANDING THE LIMITATION IN SECTION 17(a), LICENSEE SHALL NOW AND FOREVER WAIVE ANY AND ALL CLAIMS, REGARDLESS WHETHER BASED ON THE STRICT LIABILITY, NEGLIGENCE OR OTHERWISE, THAT RAILROAD IS AN "OWNER", "OPERATOR", "ARRANGER", OR "TRANSPORTER" WITH RESPECT TO THE PREMISES FOR THE PURPOSES OF CERCLA OR OTHER ENVIRONMENTAL LAWS. LICENSEE WILL INDEMNIFY, DEFEND AND HOLD THE INDEMNITEES HARMLESS FROM ANY AND ALL SUCH CLAIMS REGARDLESS OF THE NEGLIGENCE OF THE INDEMNITEES. LICENSEE FURTHER AGREES THAT THE USE OF THE PREMISES AS CONTEMPLATED BY THIS LICENSE SHALL NOT IN ANY WAY SUBJECT LICENSOR TO CLAIMS THAT LICENSOR IS OTHER THAN A COMMON CARRIER FOR PURPOSES OF ENVIRONMENTAL LAWS AND EXPRESSLY AGREES TO INDEMNIFY, DEFEND, AND HOLD THE INDEMNITEES HARMLESS FOR ANY AND ALL SUCH CLAIMS. IN NO EVENT SHALL LICENSOR BE RESPONSIBLE FOR THE ENVIRONMENTAL CONDITION OF THE PREMISES.**



- (c) TO THE FULLEST EXTENT PERMITTED BY LAW, LICENSEE FURTHER AGREES, REGARDLESS OF ANY NEGLIGENCE OR ALLEGED NEGLIGENCE OF ANY INDEMNITEE, TO INDEMNIFY, AND HOLD HARMLESS THE INDEMNITEES AGAINST AND ASSUME THE DEFENSE OF ANY LIABILITIES ASSERTED AGAINST OR SUFFERED BY ANY INDEMNITEE UNDER OR RELATED TO THE FEDERAL EMPLOYERS' LIABILITY ACT ("FELA") WHENEVER EMPLOYEES OF LICENSEE OR ANY OF ITS AGENTS, INVITEES, OR CONTRACTORS CLAIM OR ALLEGE THAT THEY ARE EMPLOYEES OF ANY INDEMNITEE OR OTHERWISE. THIS INDEMNITY SHALL ALSO EXTEND, ON THE SAME BASIS, TO FELA CLAIMS BASED ON ACTUAL OR ALLEGED VIOLATIONS OF ANY FEDERAL, STATE OR LOCAL LAWS OR REGULATIONS, INCLUDING BUT NOT LIMITED TO THE SAFETY APPLIANCE ACT, THE BOILER INSPECTION ACT, THE OCCUPATIONAL HEALTH AND SAFETY ACT, THE RESOURCE CONSERVATION AND RECOVERY ACT, AND ANY SIMILAR STATE OR FEDERAL STATUTE.
- (d) Upon written notice from Licensor, Licensee agrees to assume the defense of any lawsuit or other proceeding brought against any Indemnitee by any entity, relating to any matter covered by this License for which Licensee has an obligation to assume liability for and/or save and hold harmless any Indemnitee. Licensee shall pay all costs incident to such defense, including, but not limited to, attorneys' fees, investigators' fees, litigation and appeal expenses, settlement payments, and amounts paid in satisfaction of judgments.

#### **PERSONAL PROPERTY WAIVER**

18. ALL PERSONAL PROPERTY, INCLUDING, BUT NOT LIMITED TO, FIXTURES, EQUIPMENT, OR RELATED MATERIALS UPON THE PREMISES WILL BE AT THE RISK OF LICENSEE ONLY, AND NO INDEMNITEE WILL BE LIABLE FOR ANY DAMAGE THERETO OR THEFT THEREOF, WHETHER OR NOT DUE IN WHOLE OR IN PART TO THE NEGLIGENCE OF ANY INDEMNITEE.

#### **INSURANCE**

19. Licensee shall, at its sole cost and expense, procure and maintain during the life of this Agreement the following insurance coverage:
- A. Commercial General Liability Insurance. This insurance shall contain broad form contractual liability with a combined single limit of a minimum of \$2,000,000 each occurrence and an aggregate limit of at least \$ 4,000,000. Coverage must be purchased on a post 1998 ISO occurrence or equivalent and include coverage for, but not limited to, the following:
- ◆ Bodily Injury and Property Damage
  - ◆ Personal Injury and Advertising Injury
  - ◆ Fire legal liability
  - ◆ Products and completed operations

This policy shall also contain the following endorsements, which shall be indicated on the certificate of insurance:

The employee and workers compensation related exclusions in the above policy shall not apply with respect to claims related to railroad employees.

- ◆ The definition of insured contract shall be amended to remove any exclusion or other limitation for any work being done within 50 feet of railroad property.
- ◆ Any exclusions related to the explosion, collapse and underground hazards shall be removed.

No other endorsements limiting coverage may be included on the policy.

- B. Business Automobile Insurance. This insurance shall contain a combined single limit of at least \$1,000,000 per occurrence, and include coverage for, but not limited to the following:
- ◆ Bodily injury and property damage
  - ◆ Any and all vehicles owned, used or hired
- C. Workers Compensation and Employers Liability Insurance. This insurance shall include coverage for, but not limited to:
- ◆ Licensee's statutory liability under the worker's compensation laws of the state(s) in which the work is to be performed. If optional under State law, the insurance must cover all employees anyway.
  - ◆ Employers' Liability (Part B) with limits of at least \$500,000 each accident, \$500,000 by disease policy limit, \$500,000 by disease each employee.
- D. Railroad Protective Liability Insurance. This insurance shall name only the Licensor as the Insured with coverage of at least \$2,000,000 per occurrence and \$6,000,000 in the aggregate. The coverage obtained under this policy shall only be effective during the initial environmental testing and/or exploration. If further exploration and testing is needed at a later date, an additional Railroad Protective Liability Insurance Policy shall be required. The policy shall be issued on a standard ISO form CG 00 35 10 93 and include the following:
- ◆ Endorsed to include the Pollution Exclusion Amendment (ISO form CG 28 31 10 93)
  - ◆ Endorsed to include the Limited Seepage and Pollution Endorsement.
  - ◆ Endorsed to include Evacuation Expense Coverage Endorsement.
  - ◆ No other endorsements restricting coverage may be added.
  - ◆ The original policy must be provided to the Licensor prior to performing any work or services under this Agreement

In lieu of providing a Railroad Protective Liability Policy, Licensee may participate in Licensor's Blanket Railroad Protective Liability Insurance Policy available to Licensee or its contractor. The limits of coverage are the same as above. The cost is \$500.00.

- ☐ I **elect** to participate in Licensor's Blanket Policy;
- ☐ I **elect not** to participate in Licensor's Blanket Policy.

**Other Requirements:**

Where allowable by law all policies (applying to coverage listed above) shall contain no exclusion for punitive damages and certificates of insurance shall reflect that no exclusion exists.

Licensee agrees to waive its right of recovery against Licensor for all claims and suits against Licensor. In addition, its insurers, through policy endorsement, waive their right of subrogation against Licensor for all claims and suits. The certificate of insurance must reflect waiver of subrogation endorsement. Licensee further waives its right of recovery, and its insurers also waive their right of subrogation against Licensor for loss of its owned or leased property or property under its care, custody, or control.

Licensee's insurance policies through policy endorsement must include wording which states that the policy shall be primary and non-contributing with respect to any insurance carried by Licensor. The certificate of insurance must reflect that the above wording is included in evidenced policies.

All policy(ies) required above (excluding Workers Compensation and if applicable, Railroad Protective) shall include a severability of interest endorsement and shall name Licensor and Staubach Global Services - RR, Inc. as an additional insured with respect to work performed under this agreement. Severability of interest and naming Licensor and Staubach Global Services - RR, Inc. as additional insureds shall be indicated on the certificate of insurance.

Licensee is not allowed to self-insure without the prior written consent of Licensor. If granted by Licensor, any deductible, self-insured retention or other financial responsibility for claims shall be covered directly by Licensee in lieu of insurance. Any and all Licensor liabilities that would otherwise, in accordance with the provisions of this Agreement, be covered by Licensee's insurance will be covered as if Licensee elected not to include a deductible, self-insured retention, or other financial responsibility for claims.

Prior to commencing the Work, Licensee shall furnish to Licensor an acceptable certificate(s) of insurance including an original signature of the authorized representative evidencing the required coverage, endorsements, and amendments. The policy(ies) shall contain a provision that obligates the insurance company(ies) issuing such policy(ies) to notify Licensor in writing at least 30 days prior to any cancellation, non-renewal, substitution or material alteration. This cancellation provision shall be indicated on the certificate of insurance. In the event of a claim or lawsuit involving Railroad arising out of this agreement, Licensee will make available any required policy covering such claim or lawsuit.

Any insurance policy shall be written by a reputable insurance company acceptable to Licensor or with a current Best's Guide Rating of A- and Class VII or better, and authorized to do business in the state(s) in which the service is to be provided.

Licensee represents that this License has been thoroughly reviewed by Licensee's insurance agent(s)/broker(s), who have been instructed by Licensee to procure the insurance coverage required by this Agreement. Allocated Loss Expense shall be in addition to all policy limits for coverages referenced above.

Not more frequently than once every five years, Licensors may reasonably modify the required insurance coverage to reflect then-current risk management practices in the railroad industry and underwriting practices in the insurance industry.

If any portion of the operation is to be subcontracted by Licensee, Licensee shall require that the subcontractor shall provide and maintain insurance coverages as set forth herein, naming Licensors as an additional insured, and shall require that the subcontractor shall release, defend and indemnify Licensors to the same extent and under the same terms and conditions as Licensee is required to release, defend and indemnify Licensors herein.

Failure to provide evidence as required by this section shall entitle, but not require, Licensors to terminate this License immediately. Acceptance of a certificate that does not comply with this section shall not operate as a waiver of Licensee's obligations hereunder.

The fact that insurance (including, without limitation, self-insurance) is obtained by Licensee shall not be deemed to release or diminish the liability of Licensee including, without limitation, liability under the indemnity provisions of this License. Damages recoverable by Licensors shall not be limited by the amount of the required insurance coverage.

For purposes of this section, Licensors shall mean "Burlington Northern Santa Fe Corporation", "BNSF Railway Company" and the subsidiaries, successors, assigns and affiliates of each.

## **ENVIRONMENTAL**

20. (a) Licensee shall strictly comply with all federal, state and local environmental laws and regulations in its use of the Premises, including, but not limited to, the Resource Conservation and Recovery Act, as amended (RCRA), the Clean Water Act, the Oil Pollution Act, the Hazardous Materials Transportation Act, CERCLA (collectively referred to as the "Environmental Laws"). Licensee shall not maintain a treatment, storage, transfer or disposal facility, or underground storage tank, as defined by Environmental Laws on the Premises. Licensee shall not release or suffer the release of oil or hazardous substances, as defined by Environmental Laws on or about the Premises.
- (b) Licensee shall give Licensors immediate notice to Licensors' Resource Operations Center at (800) 832-5452 of any release of hazardous substances on or from the Premises, violation of Environmental Laws, or inspection or inquiry by governmental authorities charged with enforcing Environmental Laws with respect to Licensee's use of the Premises. Licensee shall use the best efforts to promptly respond to any release on or from the Premises.

Licensee also shall give Licensor immediate notice of all measures undertaken on behalf of Licensee to investigate, remediate, respond to or otherwise cure such release or violation.

- (c) Licensee recognizes and assumes all responsibility for all present and future environmental obligations imposed under applicable Environmental Laws, regulations or other such requirements relating to contamination of the Premises or groundwater thereunder arising from, caused by, contributed to, or in any way growing out of Licensee's operations. Licensee further agrees to undertake at its sole cost and expense any cleanup of any contamination of the Premises and groundwater thereunder arising from, caused by, contributed to, or in any way growing out of Licensee's operations as required by applicable laws and regulations.
- (d) Licensee agrees to waive any and all statutes of limitations applicable to any controversy or dispute arising out of Section 20(c), and Licensee further agrees that it will not raise or plead a statute of limitations defense against Licensor in any action arising out of Licensees' failure to comply with the preceding subsection.
- (e) In the event that Licensor has notice from Licensee or otherwise of a release or violation of Environmental Laws on the Premises which occurred or may occur during the term of this License, Licensor may require Licensee, at Licensee's sole risk and expense, to take timely measures to investigate, remediate, respond to or otherwise cure such release or violation affecting the Premises or Licensor's right-of-way.
- (f) Licensee shall promptly report to Licensor in writing any conditions or activities upon the Premises known to Licensee which create a risk of harm to persons, property or the environment and shall take whatever action is necessary to prevent injury to persons or property arising out of such conditions or activities; provided, however, that Licensee's reporting to Licensor shall not relieve Licensee of any obligation whatsoever imposed on it by this License. Licensee shall promptly respond to Licensor's request for information regarding said conditions or activities.
- (g) Licensee will promptly transmit to Licensor copies of all reports, data boring logs, well completion and other information obtained from all operations on the Premises to Licensor's Remediation Manager. Licensor shall have the option to obtain split samples and otherwise have reasonable access to the groundwater monitoring well(s) subject to this License for the purpose of obtaining samples or other information from the monitoring well(s). Licensee shall also advise Licensor of any applicable health and safety plans or other similar programs in effect with respect to the operations on the Premises.
- (h) Unless otherwise required by applicable law, Licensee shall keep confidential and shall not disclose any reports, data boring logs, well completion and any other information obtained in connection with this License to third parties without the prior written consent of Licensor.

**ALTERATIONS**

21. Licensee may not make any alterations of the Premises or permanently affix anything to the Premises or any buildings or other structures adjacent to the Premises without Licensors prior written consent.

**NO WARRANTIES**

22. **LICENSOR'S DUTIES AND WARRANTIES ARE LIMITED TO THOSE EXPRESSLY STATED IN THIS LICENSE AND SHALL NOT INCLUDE ANY IMPLIED DUTIES OR IMPLIED WARRANTIES, NOW OR IN THE FUTURE. NO REPRESENTATIONS OR WARRANTIES HAVE BEEN MADE BY LICENSOR OTHER THAN THOSE CONTAINED IN THIS LICENSE. LICENSEE HEREBY WAIVES ANY AND ALL WARRANTIES WITH RESPECT TO THE PREMISES, EXPRESS OR IMPLIED, OR WHICH MAY EXIST BY OPERATION OF LAW OR IN EQUITY, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY, HABITABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

**QUIET ENJOYMENT**

23. **LICENSOR DOES NOT WARRANT ITS TITLE TO THE PROPERTY NOR UNDERTAKE TO DEFEND LICENSEE IN THE PEACEABLE POSSESSION OR USE THEREOF. NO COVENANT OF QUIET ENJOYMENT IS MADE.**

**DEFAULT**

24. If default shall be made in any of the covenants or agreements of Licensee contained in this document, or in case of any assignment or transfer of this License by operation of law, Licensor may, at its option, terminate this License by serving five (5) days' notice in writing upon Licensee. Any waiver by Licensor of any default or defaults shall not constitute a waiver of the right to terminate this License for any subsequent default or defaults, nor shall any such waiver in any way affect Licensor's ability to enforce any Section of this License. The remedy set forth in this Section 24 shall be in addition to, and not in limitation of, any other remedies that Licensor may have at law or in equity.

**TERMINATION**

25. (a) This License may be terminated by Licensor, at any time, by serving ten (10) days' written notice of termination upon Licensee. This License may be terminated by Licensee upon execution of Licensor's Mutual Termination Letter Agreement then in effect. Upon expiration of the time specified in such notice, this License and all rights of Licensee shall absolutely cease.
- (b) Upon termination, should Licensee have installed its monitoring well(s) on the Premises, once Licensee's well(s) are retired, Licensee shall provide Licensor a copy of the closure documents, submitted directly to Licensor's Environmental Remediation Manager at 2454 Occidental Ave., 1A, Seattle, Washington 98134.

26. If Licensee fails to surrender to Licensor the Premises, upon any termination of this License, all liabilities and obligations of Licensee hereunder shall continue in effect until the Premises are surrendered. Termination shall not release Licensee from any liability or obligation, whether of indemnity or otherwise, resulting from any events happening prior to the date of termination.

### **ASSIGNMENT**

27. Neither Licensee, nor the heirs, legal representatives, successors or assigns of Licensee, nor any subsequent assignee, shall assign or transfer this License or any interest herein, without the prior written consent and approval of Licensor, which may be withheld in Licensor's sole discretion.

### **NOTICES**

28. Any notice required or permitted to be given hereunder by one party to the other shall be in writing and the same shall be given and shall be deemed to have been served and given if (i) placed in the United States mail, certified, return receipt requested, or (ii) deposited into the custody of a nationally recognized overnight delivery service, addressed to the party to be notified at the address for such party specified below, or to such other address as the party to be notified may designate by giving the other party no less than thirty (30) days' advance written notice of such change in address.

If to Licensor:           Staubach Global Services - RR, Inc.  
3017 Lou Menk Drive, Suite 100  
Fort Worth, TX 76131  
Attn: Licenses/Permits

with a copy to:       BNSF Railway Company  
2500 Lou Menk Dr. – AOB3  
Fort Worth, TX 76131  
Attn: Senior Manager Real Estate

with a copy to:       BNSF Remediation Manager  
2454 Occidental Ave., 1A  
Seattle, WA 98134

If to Licensee:       Stantec Consulting Corp.  
9400 S.W. Barnes Rd., Suite 200  
Portland, OR 97225

### **SURVIVAL**

29. Neither termination nor expiration will release either party from any liability or obligation under this License, whether of indemnity or otherwise, resulting from any acts, omissions or events happening prior to the date of termination or expiration, or, if later, the date when the Premises are restored to its condition as of the Effective Date.

### **RECORDATION**

30. It is understood and agreed that this License shall not be placed on public record.

### **APPLICABLE LAW**

31. All questions concerning the interpretation or application of provisions of this License shall be decided according to the substantive laws of the State of Texas without regard to conflicts of law provisions.

### **SEVERABILITY**

32. To the maximum extent possible, each provision of this License shall be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this License shall be prohibited by, or held to be invalid under, applicable law, such provision shall be ineffective solely to the extent of such prohibition or invalidity, and this shall not invalidate the remainder of such provision or any other provision of this License.

### **INTEGRATION**

33. This License is the full and complete agreement between Licensors and Licensee with respect to all matters relating to Licensee's use of the Premises, and supersedes any and all other agreements between the parties hereto relating to Licensee's use of the Premises as described herein. However, nothing herein is intended to terminate either any surviving obligation of Licensee or Licensee's obligation to defend and hold Licensors harmless in any prior written agreement between the parties.

### **MISCELLANEOUS**

34. In the event that Licensee consists of two or more parties, all the covenants and agreements of Licensee herein contained shall be the joint and several covenants and agreements of such parties.

[Intentionally left blank]



35. The waiver by Licensor of the breach of any provision herein by Licensee shall in no way impair the right of Licensor to enforce that provision for any subsequent breach thereof.

Staubach Global Services – RR, Inc. is acting as representative for BNSF Railway Company.

**IN WITNESS WHEREOF**, this License has been duly executed, in duplicate, by the parties hereto as of the day and year first above written.

**BNSF RAILWAY COMPANY**

Staubach Global Services – RR, Inc.,  
its Attorney in Fact  
3017 Lou Menk Drive, Suite 100  
Fort Worth, TX 76131

By: \_\_\_\_\_  
Ed Darter  
Title: Vice President – National Accounts

**STANTEC CONSULTING CORP.**

9400 S.W. Barnes Rd., Suite 200  
Portland, OR 97225

By: \_\_\_\_\_  
Title: \_\_\_\_\_

# EXHIBIT "A"

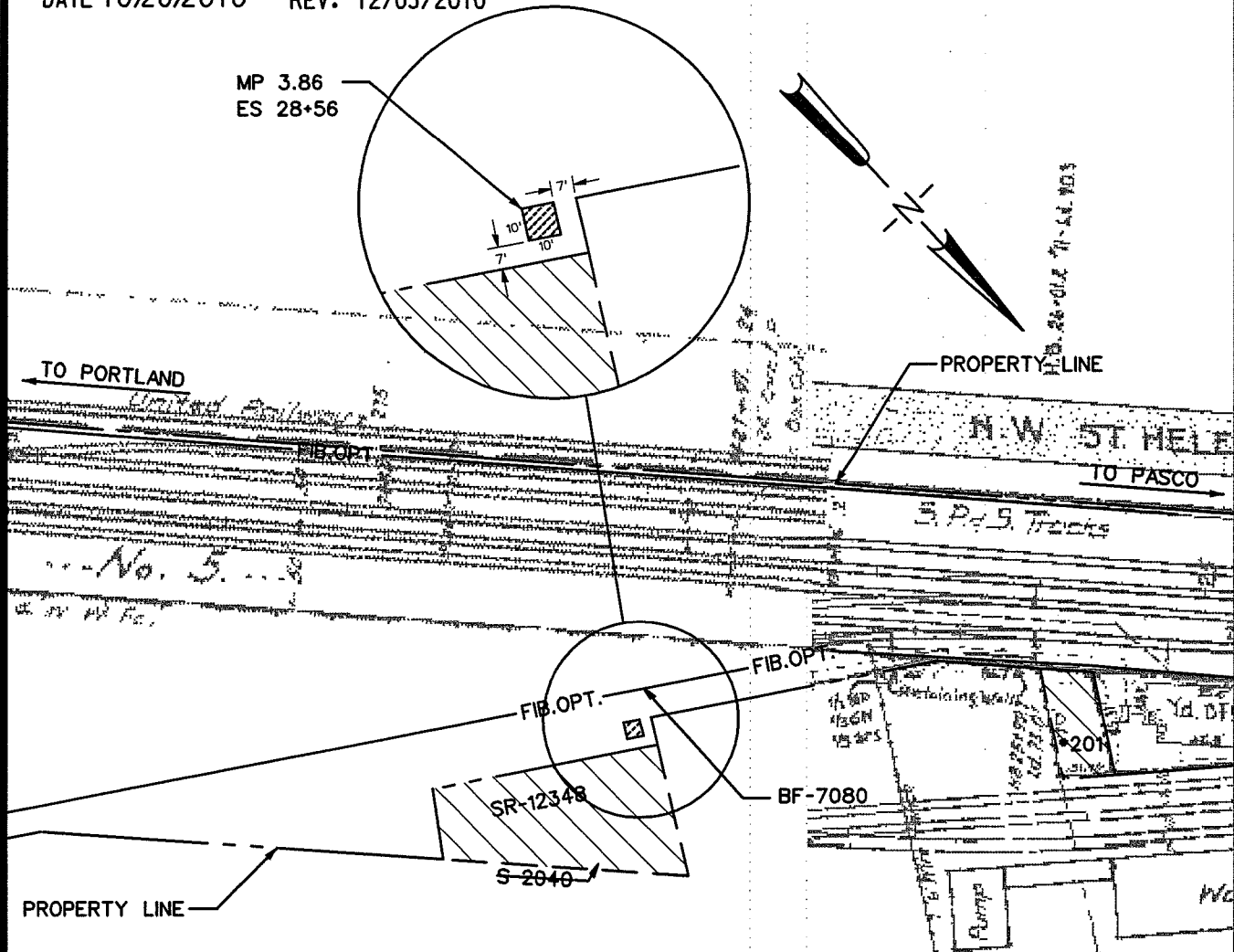
ATTACHED TO CONTRACT BETWEEN  
BNSF RAILWAY COMPANY  
AND

## STANTEC CONSULTING CORP.

MAP REF. S62352

SCALE: 1 IN. = 100 FT.  
NORTHWEST DIV.  
FALLBRIDGE SUBDIV. L.S. 0047  
DATE 10/20/2010 REV. 12/03/2010

SECTION: 19  
TOWNSHIP: 01N  
RANGE: 01E  
MERIDIAN: WILLM



### DESCRIPTION:

1 PARCEL OF LAND CONTAINING A TOTAL OF 100 SQ. FT.  
(0.002 A.C.) MORE OR LESS SHOWN SHADED. TO BE USED  
FOR STORM WATER SAMPLING AND MONITORING OF MANHOLE.

AT PORTLAND  
COUNTY OF MULTNOMAH

STATE OF OR

JWD

REVISION 1

DRAWING NO. 1-50309

COP0020124

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**From:** Trewartha, Mark  
**Sent:** Thursday, February 10, 2011 09:56 PM  
**To:** ROMERO Mike  
**CC:** Larsen, Alice; Carlton-Franco, Chris; Solomon, Rich; Hetrick, Eric G  
**Subject:** Pipe Replacement work at the Portland Terminal

Mike,

As mentioned during the WTG meeting, the Portland Terminal is planning to remove pipeline dead legs (pipelines that are not needed). The Terminal anticipates digging in 4 distinct locations. The work is scheduled for February 28th. Stantec will be onsite to observe and collect samples as necessary.

Let me know if you have any questions.

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
Fx: (503) 297-5429  
Cell: (503) 807-8568

stantec.com <<http://www.stantec.com>>

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**COP0020125**

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**From:** ROMERO Mike  
**Sent:** Friday, February 11, 2011 01:49 AM  
**To:** Trewartha, Mark  
**CC:** Larsen, Alice; Carlton-Franco, Chris; Solomon, Rich; Hetrick, Eric G  
**Subject:** RE: Pipe Replacement work at the Portland Terminal

Thanks Mark. Just remember to follow the Contaminated Media Management Plan for the site and if any source areas are discovered, be sure to document and record it (pictures, samples, figures). A site figure or map showing the location of the lines should be prepared along with any summary necessary to document waste disposal. Do you know if the lines are currently capped or are they still connected to tanks or what? Also, be sure that the facility has obtained whatever permits are necessary from City of Portland Development Services (i.e. plumbing permits, erosion control plan etc...). Also, make sure to evaluate if the earth moving part of this needs a construction stormwater permit (1200c).

Mike

From: Trewartha, Mark [mailto:Mark.Trewartha@stantec.com]  
Sent: Thursday, February 10, 2011 1:56 PM  
To: ROMERO Mike  
Cc: Larsen, Alice; Carlton-Franco, Chris; Solomon, Rich; Hetrick, Eric G  
Subject: Pipe Replacement work at the Portland Terminal

Mike,

As mentioned during the WTG meeting, the Portland Terminal is planning to remove pipeline dead legs (pipelines that are not needed). The Terminal anticipates digging in 4 distinct locations. The work is scheduled for February 28th. Stantec will be onsite to observe and collect samples as necessary.

Let me know if you have any questions.

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
Fx: (503) 297-5429  
Cell: (503) 807-8568

stantec.com <<http://www.stantec.com>>

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**From:** Calhoun, Heather (US)  
**Sent:** Thursday, February 10, 2011 06:10 PM  
**To:** Mozart, Angie (PTS Staffing Solutions)  
**Subject:** FW: Red-Line: Stantec Consulting Corp. (Tracking #10-41650)  
**Attachments:** Agreement - Stantec Consulting Corp. 10-41597 (Redline to Angie Mozart 02-10-11).doc

Correction - see below.

Heather Calhoun  
tel +1 817-230-2600 direct +1 817-230-2633  
Please visit the BNSF Permits website for more information:  
<<http://www.bnsf.com/communities/faqs/permits-real-estate/>>  
<http://www.bnsf.com/communities/faqs/permits-real-estate/>

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From: Calhoun, Heather (US)  
Sent: Thursday, February 10, 2011 12:05 PM  
To: 'Mozart, Angie (PTS Staffing Solutions)'  
Subject: Red-Line: Stantec Consulting Corp. (Tracking #10-41650)

Angie:

Per your request, attached is a copy of the agreement for red-lining purposes. Once you have finished, please e-mail the document back to me and I will forward it on to the appropriate person(s) within BNSF.

There will be a \$600 revision fee for the name change. I will have to send it back to the engineering firm to have it corrected.

I apologize for the delay but our office was closed four days last week as well as yesterday due to inclement weather.

Please contact me if you have any questions.

Thanks!

Heather Calhoun  
tel +1 817-230-2600 direct +1 817-230-2633  
Please visit the BNSF Permits website for more information:  
<<http://www.bnsf.com/communities/faqs/permits-real-estate/>>  
<http://www.bnsf.com/communities/faqs/permits-real-estate/>

---

From: Mozart, Angie (PTS Staffing Solutions) [mailto:Angie.Mozart@contractor.conocophillips.com]  
Sent: Thursday, February 10, 2011 11:05 AM  
To: Calhoun, Heather (US)  
Subject: RE: Pending Environmental Access Permit: ConocoPhillips Company and Stantec Consulting Corp. (Tracking #10-41650)

Heather,

**COP0020128**

As we discussed on the phone on 1/28/11, I was hoping you might be able to send me the updated agreement in ConocoPhillips' name in Word format, with the specifics of the additional name change fee.

Regards,

Angie Mozart

Contracts Associate

Phone: (805) 226-2653

angie.mozart@contractor.conocophillips.com

---

From: Mozart, Angie (PTS Staffing Solutions)

Sent: Monday, January 24, 2011 11:26 AM

To: 'Calhoun, Heather (US)'

Subject: RE: Pending Environmental Access Permit: ConocoPhillips Company and Stantec Consulting Corp. (Tracking #10-41650)

Heather,

I apologize for our confusion. I was forwarded the License for Environmental Access (Tracking #10-41597) last week to process for the correct ConocoPhillips internal approvals and signature. Since ConocoPhillips is the responsible party, and Stantec is our contractor, the agreement will need to be between BNSF and ConocoPhillips. Would it be possible to please get a new version updated to ConocoPhillips?

Also, I will need to have ConocoPhillips Legal and Corporate Insurance departments review and approve the agreement. Would it be possible to get that in Word version?

So that you know, ConocoPhillips recently processed an agreement with BNSF which was finalized August of 2010 with Julie Alexander, Tracking #10-40781 (in case it's helpful to review that file). I will remind our Corporate Insurance of the review process for that agreement as well, to hopefully help our approval process.

Should I contact Aimee Austin directly to get written consent from BNSF to allow ConocoPhillips to self-insure?

Regards,

Angie Mozart

Contracts Associate

Principal Technical Services - Approved service provider of

ConocoPhillips Company, Corporate Real Estate -

Property Tax, Real Estate, Right of Way & Claims (PTRRC)

1232 Park Street, Suite 300

**COP0020129**

Paso Robles, CA 93446

Phone: (805) 226-2653

angie.mozart@contractor.conocophillips.com

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The information contained in this message may be CONFIDENTIAL and is intended for the addressee only. Any unauthorized use, dissemination of the information or copying of this message is prohibited. If you are not the addressee, please notify the sender immediately by return e-mail and delete this message. Thank You.

-----  
From: Calhoun, Heather (US) [mailto:Heather.Calhoun@am.jll.com]  
Sent: Friday, December 03, 2010 7:20 AM  
To: mark.trewartha@stantec.com  
Cc: Mozart, Angie (PTS Staffing Solutions)  
Subject: RE: Pending Environmental Access Permit: ConocoPhillips Company and Stantec Consulting Corp. (Tracking #10-41650)  
Importance: High

Mark:

One more thing - I also have a pending Environmental Access application for ConocoPhillips Company and Stantec Consulting Corp. (Tracking #10-41597). This was received on 10/18/10 and appears to be at the same exact location as the application referenced below (Tracking #10-41650). You and I spoke back in October regarding both names being listed on that application, and you were going to submit a revised copy. Please confirm if you all need two permits or if these are duplicates. I will cancel one of them if that is the case.

Let me know as soon as possible.

Thanks!

Heather Calhoun  
tel +1 817-230-2600 direct +1 817-230-2633  
Please visit the BNSF Permits website for more information:  
<<http://www.bnsf.com/communities/faqs/permits-real-estate/>>  
<http://www.bnsf.com/communities/faqs/permits-real-estate/>

-----  
From: Calhoun, Heather (US)  
Sent: Friday, December 03, 2010 9:09 AM  
To: 'mark.trewartha@stantec.com'  
Cc: 'angie.mozart@contractor.conocophillips.com'  
Subject: Pending Environmental Access Permit: ConocoPhillips Company and Stantec Consulting Corp. (Tracking #10-41650)  
Importance: High

Mark:

This e-mail is regarding the Environmental Access application submitted to conduct soil sampling and manhole monitoring in Portland, Multnomah County, Oregon. I received a voicemail from Nicole at AECOM requesting a status of this permit. I am currently waiting on an approval from BNSF Operating. That request was sent on 11/16/10 and I sent a follow-up this morning. Please be

**COP0020130**



advised that I need one point of contact for this permit and you are the person listed on the application. If you could update everyone involved on this project I would appreciate it.

Also, there are two names listed on the application but we can only have one Licensee. Please advise whether this permit will be under the name of ConocoPhillips Company or Stantec Consulting Corp. I am assuming it will be under Stantec's name since they are the contractor and will be doing the work, but I am asking that you confirm.

Please advise at your next earliest convenience and contact me with any questions.

Thanks!

Jones Lang LaSalle - Proud Real Estate Partner of BNSF

Heather Calhoun  
Senior Contract Specialist - Fort Worth  
Jones Lang LaSalle Americas, Inc.  
3017 Lou Menk Dr., Suite 100  
Fort Worth, Texas 76131-2800  
tel +1 817-230-2600 direct +1 817-230-2633  
fax +1 817-306-8265  
heather.calhoun@am.jll.com

[www.joneslanglasalle.com](http://www.joneslanglasalle.com)  
Please visit the BNSF Permits website for more information:  
<http://www.bnsf.com/communities/faqs/permits-real-estate/>

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**COP0020131**

**LICENSE FOR ENVIRONMENTAL ACCESS**

**THIS LICENSE** ("License"), made as of the \_\_\_\_ day of \_\_\_\_\_, 2011 ("Effective Date") by and between **BNSF RAILWAY COMPANY**, a Delaware corporation ("Licensor") and **STANTEC CONSULTING CORP.**, a Delaware corporation ("Licensee").

**NOW THEREFORE**, in consideration of the mutual covenants contained herein, the parties agree to the following:

**GENERAL**

1. Licensor hereby grants Licensee a non-exclusive license, subject to all rights, interests, and estates of third parties, including, without limitation, any leases, licenses, easements, liens or other encumbrances, and upon the terms and conditions set forth below, to use the area of Licensor's property shown on the attached Drawing No. 1-50309, dated October 20, 2010 and revised December 3, 2010, attached hereto, marked Exhibit "A", and made a part hereof, situated at or near Portland, County of Multnomah, State of Oregon, Line Segment 0047, Mile Post 3.86 ("Premises") for the purposes specified in Section 3 below.
2. Licensee shall not disturb any improvements of Licensor or Licensor's existing lessees, licensees, easement beneficiaries or lien holders, if any, or interfere with the use of such improvements.
3. Licensee shall use Premises exclusively as a site for performing environmental and engineering explorations to include one of, or a combination of, the following categories of work:
  - (a) Drilling of soil test borings;
  - (b) Installation of groundwater monitoring wells;
  - (c) Performing groundwater inflow tests on wells;
  - (d) Obtaining groundwater samples from wells;
  - (e) Maintenance and/or checking groundwater level in wells approximately one time per month;
  - (f) Performance of any necessary remediation as determined by Licensor in its sole discretion or by applicable state and/ or federal regulations at Licensee's sole cost and expense. In the event applicable state and/or federal regulations require that the Premises be remediated, Licensee will obtain a No Further Action Letter, Release, or other such equivalent closure document from the state or federal agency having jurisdiction over the remediation of the Premises. Such No Further Action Letter, Release, or other such equivalent closure document shall not be contingent upon or specify the performance of any further work or conditions with respect to the Premises. Licensee warrants that it will conduct quarterly storm water sampling and monitor a manhole to test for petroleum related constituents. Licensee shall not use the Premises for any other purpose whatsoever. Licensee shall not use or store hazardous substances, as defined by the Comprehensive Environmental Response, Compensation, and Liability Act, as amended ("CERCLA") or petroleum or oil as defined by applicable Environmental Laws on the Premises.

4. In case of the eviction of Licensee by anyone owning or claiming title to or any interest in the Premises, Licensors shall not be liable to refund Licensee any compensation paid hereunder or for any damage Licensee sustains in connection therewith.
5. Any contractors or subcontractors performing work on the Premises, or entering the Premises on behalf of Licensee, shall be deemed agents of Licensee for purposes of this License.

#### **TERM**

6. This License shall commence on the Effective Date and shall continue for a period of two (2) years, subject to prior termination as hereinafter described.

#### **COMPENSATION**

7. (a) The fee for this License has been waived.
- (b) Licensee agrees to reimburse Licensors (within thirty (30) days after receipt of bills therefor) for all costs and expenses incurred by Licensors in connection with Licensee's use of the Premises, including but not limited to the furnishing of Licensors' Flagman and any vehicle rental costs incurred. The cost of flagger services provided by the Railway, when deemed necessary by the Railway's representative, will be borne by the Licensee. The estimated cost for one (1) flagger is \$800.00 for an eight (8) hour basic day with time and one-half or double time for overtime, rest days and holidays. The estimated cost for each flagger includes vacation allowance, paid holidays, Railway and unemployment insurance, public liability and property damage insurance, health and welfare benefits, transportation, meals, lodging and supervision. Negotiations for Railway labor or collective bargaining agreements and rate changes authorized by appropriate Federal authorities may increase actual or estimated flagging rates. The flagging rate in effect at the time of performance by the Contractor hereunder will be used to calculate the actual costs of flagging pursuant to this paragraph.
- (c) All invoices are due thirty (30) days after the date of invoice. In the event that Licensee shall fail to pay any monies due to Licensors within thirty (30) days after the invoice date, then Licensee shall pay interest on such unpaid sum from thirty (30) days after its invoice date to the date of payment by Licensee at an annual rate equal to (i) the greater of (a) for the period January 1 through June 30, the prime rate last published in *The Wall Street Journal* in the preceding December plus two and one-half percent (2 1/2%), and for the period July 1 through December 31, the prime rate last published in *The Wall Street Journal* in the preceding June plus two and one-half percent (2 1/2%), or (b) twelve percent (12%), or (ii) the maximum rate permitted by law, whichever is less.

**COMPLIANCE WITH LAWS**

8. (a) Licensee shall observe and comply with any and all laws, statutes, regulations, ordinances, orders, covenants, restrictions, or decisions of any court of competent jurisdiction ("Legal Requirements") relating to the use of the Premises.
- (b) Prior to entering the Premises, Licensee shall and shall cause its contractor to comply with all Licensor's applicable safety rules and regulations. Prior to commencing any work on the Premises, Licensee shall complete and shall require its contractor to complete the safety-training program at the following Internet Website "<http://contractororientation.com>". This training must be completed no more than one year in advance of Licensee's entry on the Premises.

**DEFINITION OF COST AND EXPENSE**

9. For the purpose of this License, "cost" or "costs" "expense" or "expenses" includes, but is not limited to, actual labor and material costs including all assignable additives, and material and supply costs at current value where used.

**RIGHT OF LICENSOR TO USE**

10. Licensor excepts and reserves the right, to be exercised by Licensor and any other parties who may obtain written permission or authority from Licensor:
  - (a) to maintain, renew, use, operate, change, modify and relocate any existing pipe, power, communication lines and appurtenances and other facilities or structures of like character upon, over, under or across the Premises;
  - (b) to construct, maintain, renew, use, operate, change, modify and relocate any tracks or additional facilities or structures upon, over, under or across the Premises; or
  - (c) to use the Premises in any manner as the Licensor in its sole discretion deems appropriate, provided Licensor uses all commercially reasonable efforts to avoid material interference with the use of the Premises by Licensee for the purpose specified in Section 3 above.

**LICENSEE'S OPERATIONS**

11. (a) Licensee shall notify Licensor's Roadmaster at 1515 W. 39<sup>th</sup> St., Vancouver, Washington 98660, telephone (360) 418-6324 or cell (360) 772-3353, and Licensor's Remediation Manager at 2454 Occidental Ave., 1A, Seattle, Washington 98134, telephone (206) 625-6376, at least ten (10) business days prior to entering the Premises. After completion of use of the Premises for the

purpose specified in Section 3, Licensee shall notify Licensor in writing that such use has been completed.

- (b) In performing the work described in Section 3, Licensee shall use only public roadways to cross from one side of Licensor's tracks to the other.
  - (c) Prior to the commencement of any work, Licensee shall submit a workplan to Licensor's Remediation Manager at 2454 Occidental Ave., 1A, Seattle, Washington 98134, telephone (206) 625-6376, for Licensor's review. No work, as set forth in Section 3, may be conducted by Licensee without Licensor's written consent of said workplan for the purpose specified in Section 3. Such review and consent by Licensor shall not constitute the sufficiency or effectiveness of any workplan.
  - (d) No monitoring wells may be installed on the property prior to written approval of Licensee's workplan for the installation of such monitoring wells. Upon obtaining such consent, Licensee shall provide Licensor the location of said well(s) relative to Licensor's nearest trackage, identifying Licensor's nearest Mile Post sign number.
12. Under no conditions shall Licensee be permitted to conduct any tests, investigations or any other activity using mechanized equipment and/or machinery, or place or store any mechanized equipment, tools or other materials, within twenty-five (25) feet of the centerline of any railroad track on the Premises unless Licensee has obtained prior written approval from Licensor. Licensee shall, at its sole cost and expense, perform all activities on and about the Premises in such a manner as not at any time to be a source of danger to or interference with the existence or use of present or future tracks, roadbed or property of Licensor, or the safe operation and activities of Licensor. If ordered to cease using the Premises at any time by Licensor's personnel due to any hazardous condition, Licensee shall immediately do so. Notwithstanding the foregoing right of Licensor, the parties agree that Licensor has no duty or obligation to monitor Licensee's use of the Premises to determine the safe nature thereof, it being solely Licensee's responsibility to ensure that Licensee's use of the Premises is safe. Neither the exercise nor the failure by Licensor to exercise any rights granted in this Section will alter the liability allocation provided by this License.
13. (a) Licensee shall explore the proposed location for such work with hand tools to a depth of at least three (3) feet below the surface of the ground to determine whether pipelines or other structures exist below the surface, provided, however, that in lieu of the foregoing, the Licensee shall have the right to use suitable detection equipment or other generally accepted industry practice (e.g., consulting with the Underground Services Association) to determine the existence or location of pipelines and other subsurface structures prior to drilling or excavating with mechanized equipment. Upon Licensee's written request, which shall be made thirty (30) business days in advance of Licensee's requested entry on the Premises, Licensor will provide Licensee any information that Licensor's Engineering Department has in its possession concerning the existence and approximate location of Licensor's underground utilities and pipelines on the Premises. Prior to conducting any such boring work, the Licensee will review all such material. Licensor does not warrant the

accuracy or completeness of information relating to subsurface conditions and Licensee's operations will be subject at all times to the liability provisions herein.

- (b) For all bores greater than 26-inch diameter and at a depth less than 10.0 feet below bottom of rail, a soil investigation will need to be performed by the Licensee and reviewed by Licensor prior to construction. This study is to determine if granular material is present, and to prevent subsidence during the installation process. If the investigation determines in Licensor's reasonable opinion that granular material is present, Licensor may select a new location for Licensee's use, or may require Licensee to furnish for Licensor's review and approval, in its sole discretion a remedial plan to deal with the granular material. Once Licensor has approved any such remedial plan in writing, Licensee shall, at its sole cost and expense, carry out the approved plan in accordance with all terms thereof and hereof.
- 14. Any open hole, boring or well constructed upon Premises by Licensee shall be safely covered and secured at all times when Licensee is not working in the actual vicinity thereof. Following completion of that portion of the work, all holes or borings constructed on the Premises by Licensee shall be:
  - (a) filled in to surrounding ground level with compacted bentonite grout; or
  - (b) otherwise secured or retired in accordance with any applicable Legal Requirement. No excavated materials may remain on the Premises for more than ten (10) days, but must be properly disposed of by Licensee in accordance with applicable Legal Requirements.
- 15. Upon completion of Licensee's work on the Premises or upon termination of this License, whichever shall occur first, Licensee shall, at its sole cost and expense:
  - (a) remove all of its equipment from the Premises;
  - (b) report and restore any damage to the Premises arising from, growing out of, or connected with Licensee's use of the Premises;
  - (c) remedy any unsafe conditions on the Premises created or aggravated by Licensee; and
  - (d) perform any other work to restore the Premises to a useable condition as deemed necessary in Licensor's sole discretion.
- 16. Licensee's on-site supervision shall retain/maintain a fully-executed copy of this License at all times while on the Premises.

#### **LIABILITY**

- 17. (a) **TO THE FULLEST EXTENT PERMITTED BY LAW, LICENSEE SHALL RELEASE, INDEMNIFY, DEFEND AND HOLD HARMLESS LICENSOR AND LICENSOR'S AFFILIATED COMPANIES, PARTNERS, SUCCESSORS,**

ASSIGNS, LEGAL REPRESENTATIVES, OFFICERS, DIRECTORS, SHAREHOLDERS, EMPLOYEES AND AGENTS (COLLECTIVELY, "INDEMNITEES") FOR, FROM AND AGAINST ANY AND ALL CLAIMS, LIABILITIES, FINES, PENALTIES, COSTS, DAMAGES, LOSSES, LIENS, CAUSES OF ACTION, SUITS, DEMANDS, JUDGMENTS AND EXPENSES (INCLUDING, WITHOUT LIMITATION, COURT COSTS, ATTORNEYS' FEES AND COSTS OF INVESTIGATION, REMOVAL AND REMEDIATION AND GOVERNMENTAL OVERSIGHT COSTS) ENVIRONMENTAL OR OTHERWISE (COLLECTIVELY "LIABILITIES") OF ANY NATURE, KIND OR DESCRIPTION OF ANY PERSON OR ENTITY DIRECTLY OR INDIRECTLY ARISING OUT OF, RESULTING FROM OR RELATED TO (IN WHOLE OR IN PART):

- (i) THIS LICENSE, INCLUDING, WITHOUT LIMITATION, ITS ENVIRONMENTAL PROVISIONS,
- (ii) ANY RIGHTS OR INTERESTS GRANTED PURSUANT TO THIS LICENSE,
- (iii) LICENSEE'S OCCUPATION AND USE OF THE PREMISES,
- (iv) THE ENVIRONMENTAL CONDITION AND STATUS OF THE PREMISES CAUSED BY OR CONTRIBUTED BY LICENSEE, OR
- (v) ANY ACT OR OMISSION OF LICENSEE OR LICENSEE'S OFFICERS, AGENTS, INVITEES, EMPLOYEES, OR CONTRACTORS, OR ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM, OR ANYONE THEY CONTROL OR EXERCISE CONTROL OVER,

EVEN IF SUCH LIABILITIES ARISE FROM OR ARE ATTRIBUTED TO, IN WHOLE OR IN PART, ANY NEGLIGENCE OF ANY INDEMNITEE. THE ONLY LIABILITIES WITH RESPECT TO WHICH LICENSEE'S OBLIGATION TO INDEMNIFY THE INDEMNITEES DOES NOT APPLY ARE LIABILITIES TO THE EXTENT PROXIMATELY CAUSED BY THE GROSS NEGLIGENCE OR WILLFUL MISCONDUCT OF AN INDEMNITEE.

- (b) FURTHER, TO THE FULLEST EXTENT PERMITTED BY LAW, NOTWITHSTANDING THE LIMITATION IN SECTION 17(a), LICENSEE SHALL NOW AND FOREVER WAIVE ANY AND ALL CLAIMS, REGARDLESS WHETHER BASED ON THE STRICT LIABILITY, NEGLIGENCE OR OTHERWISE, THAT RAILROAD IS AN "OWNER", "OPERATOR", "ARRANGER", OR "TRANSPORTER" WITH RESPECT TO THE PREMISES FOR THE PURPOSES OF CERCLA OR OTHER ENVIRONMENTAL LAWS. LICENSEE WILL INDEMNIFY, DEFEND AND HOLD THE INDEMNITEES HARMLESS FROM ANY AND ALL SUCH CLAIMS REGARDLESS OF THE NEGLIGENCE OF THE INDEMNITEES. LICENSEE FURTHER AGREES THAT THE USE OF THE PREMISES AS CONTEMPLATED BY THIS LICENSE SHALL NOT IN ANY WAY SUBJECT LICENSOR TO CLAIMS THAT

LICENSOR IS OTHER THAN A COMMON CARRIER FOR PURPOSES OF ENVIRONMENTAL LAWS AND EXPRESSLY AGREES TO INDEMNIFY, DEFEND, AND HOLD THE INDEMNITEES HARMLESS FOR ANY AND ALL SUCH CLAIMS. IN NO EVENT SHALL LICENSOR BE RESPONSIBLE FOR THE ENVIRONMENTAL CONDITION OF THE PREMISES.

- (c) TO THE FULLEST EXTENT PERMITTED BY LAW, LICENSEE FURTHER AGREES, REGARDLESS OF ANY NEGLIGENCE OR ALLEGED NEGLIGENCE OF ANY INDEMNITEE, TO INDEMNIFY, AND HOLD HARMLESS THE INDEMNITEES AGAINST AND ASSUME THE DEFENSE OF ANY LIABILITIES ASSERTED AGAINST OR SUFFERED BY ANY INDEMNITEE UNDER OR RELATED TO THE FEDERAL EMPLOYERS' LIABILITY ACT ("FELA") WHENEVER EMPLOYEES OF LICENSEE OR ANY OF ITS AGENTS, INVITEES, OR CONTRACTORS CLAIM OR ALLEGE THAT THEY ARE EMPLOYEES OF ANY INDEMNITEE OR OTHERWISE. THIS INDEMNITY SHALL ALSO EXTEND, ON THE SAME BASIS, TO FELA CLAIMS BASED ON ACTUAL OR ALLEGED VIOLATIONS OF ANY FEDERAL, STATE OR LOCAL LAWS OR REGULATIONS, INCLUDING BUT NOT LIMITED TO THE SAFETY APPLIANCE ACT, THE BOILER INSPECTION ACT, THE OCCUPATIONAL HEALTH AND SAFETY ACT, THE RESOURCE CONSERVATION AND RECOVERY ACT, AND ANY SIMILAR STATE OR FEDERAL STATUTE.
- (d) Upon written notice from Licensor, Licensee agrees to assume the defense of any lawsuit or other proceeding brought against any Indemnatee by any entity, relating to any matter covered by this License for which Licensee has an obligation to assume liability for and/or save and hold harmless any Indemnatee. Licensee shall pay all costs incident to such defense, including, but not limited to, attorneys' fees, investigators' fees, litigation and appeal expenses, settlement payments, and amounts paid in satisfaction of judgments.

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#### **PERSONAL PROPERTY WAIVER**

18. ALL PERSONAL PROPERTY, INCLUDING, BUT NOT LIMITED TO, FIXTURES, EQUIPMENT, OR RELATED MATERIALS UPON THE PREMISES WILL BE AT THE RISK OF LICENSEE ONLY, AND NO INDEMNITEE WILL BE LIABLE FOR ANY DAMAGE THERETO OR THEFT THEREOF, WHETHER OR NOT DUE IN WHOLE OR IN PART TO THE NEGLIGENCE OF ANY INDEMNITEE.

#### **INSURANCE**

19. Licensee shall, at its sole cost and expense, procure and maintain during the life of this Agreement the following insurance coverage:
- A. Commercial General Liability Insurance. This insurance shall contain broad form contractual liability with a combined single limit of a minimum of \$2,000,000 each occurrence and an aggregate limit of at least \$ 4,000,000.



Coverage must be purchased on a post 1998 ISO occurrence or equivalent and include coverage for, but not limited to, the following:

- ◆ Bodily Injury and Property Damage
- ◆ Personal Injury and Advertising Injury
- ◆ Fire legal liability
- ◆ Products and completed operations

This policy shall also contain the following endorsements, which shall be indicated on the certificate of insurance:

The employee and workers compensation related exclusions in the above policy shall not apply with respect to claims related to railroad employees.

- ◆ The definition of insured contract shall be amended to remove any exclusion or other limitation for any work being done within 50 feet of railroad property.
- ◆ Any exclusions related to the explosion, collapse and underground hazards shall be removed.

No other endorsements limiting coverage may be included on the policy.

- B. Business Automobile Insurance. This insurance shall contain a combined single limit of at least \$1,000,000 per occurrence, and include coverage for, but not limited to the following:
  - ◆ Bodily injury and property damage
  - ◆ Any and all vehicles owned, used or hired
- C. Workers Compensation and Employers Liability Insurance. This insurance shall include coverage for, but not limited to:
  - ◆ Licensee's statutory liability under the worker's compensation laws of the state(s) in which the work is to be performed. If optional under State law, the insurance must cover all employees anyway.
  - ◆ Employers' Liability (Part B) with limits of at least \$500,000 each accident, \$500,000 by disease policy limit, \$500,000 by disease each employee.
- D. Railroad Protective Liability Insurance. This insurance shall name only the Licensor as the Insured with coverage of at least \$2,000,000 per occurrence and \$6,000,000 in the aggregate. The coverage obtained under this policy shall only be effective during the initial environmental testing and/or exploration. If further exploration and testing is needed at a later date, an additional Railroad Protective Liability Insurance Policy shall be required. The policy shall be issued on a standard ISO form CG 00 35 10 93 and include the following:
  - ◆ Endorsed to include the Pollution Exclusion Amendment (ISO form CG 28 31 10 93)
  - ◆ Endorsed to include the Limited Seepage and Pollution Endorsement.
  - ◆ Endorsed to include Evacuation Expense Coverage Endorsement.
  - ◆ No other endorsements restricting coverage may be added.
  - ◆ The original policy must be provided to the Licensor prior to performing any work or services under this Agreement

In lieu of providing a Railroad Protective Liability Policy, Licensee may participate in Licensors Blanket Railroad Protective Liability Insurance Policy available to Licensee or its contractor. The limits of coverage are the same as above. The cost is \$500.00.

- ☐ I **elect** to participate in Licensors Blanket Policy;
- ☐ I **elect not** to participate in Licensors Blanket Policy.

Other Requirements:

Where allowable by law all policies (applying to coverage listed above) shall contain no exclusion for punitive damages and certificates of insurance shall reflect that no exclusion exists.

Licensee agrees to waive its right of recovery against Licensors for all claims and suits against Licensors. In addition, its insurers, through policy endorsement, waive their right of subrogation against Licensors for all claims and suits. The certificate of insurance must reflect waiver of subrogation endorsement. Licensee further waives its right of recovery, and its insurers also waive their right of subrogation against Licensors for loss of its owned or leased property or property under its care, custody, or control.

Licensees insurance policies through policy endorsement must include wording which states that the policy shall be primary and non-contributing with respect to any insurance carried by Licensors. The certificate of insurance must reflect that the above wording is included in evidenced policies.

All policy(ies) required above (excluding Workers Compensation and if applicable, Railroad Protective) shall include a severability of interest endorsement and shall name Licensors and Staubach Global Services - RR, Inc. as an additional insured with respect to work performed under this agreement. Severability of interest and naming Licensors and Staubach Global Services - RR, Inc. as additional insureds shall be indicated on the certificate of insurance.

Licensee is not allowed to self-insure without the prior written consent of Licensors. If granted by Licensors, any deductible, self-insured retention or other financial responsibility for claims shall be covered directly by Licensee in lieu of insurance. Any and all Licensors liabilities that would otherwise, in accordance with the provisions of this Agreement, be covered by Licensees insurance will be covered as if Licensee elected not to include a deductible, self-insured retention, or other financial responsibility for claims.

Prior to commencing the Work, Licensee shall furnish to Licensors an acceptable certificate(s) of insurance including an original signature of the authorized representative evidencing the required coverage, endorsements, and amendments. The policy(ies) shall contain a provision that obligates the insurance company(ies) issuing such policy(ies) to notify Licensors in writing at least 30 days prior to any cancellation, non-renewal, substitution or material alteration. This cancellation

provision shall be indicated on the certificate of insurance. In the event of a claim or lawsuit involving Railroad arising out of this agreement, Licensee will make available any required policy covering such claim or lawsuit.

Any insurance policy shall be written by a reputable insurance company acceptable to Licensor or with a current Best's Guide Rating of A- and Class VII or better, and authorized to do business in the state(s) in which the service is to be provided.

Licensee represents that this License has been thoroughly reviewed by Licensee's insurance agent(s)/broker(s), who have been instructed by Licensee to procure the insurance coverage required by this Agreement. Allocated Loss Expense shall be in addition to all policy limits for coverages referenced above.

Not more frequently than once every five years, Licensor may reasonably modify the required insurance coverage to reflect then-current risk management practices in the railroad industry and underwriting practices in the insurance industry.

If any portion of the operation is to be subcontracted by Licensee, Licensee shall require that the subcontractor shall provide and maintain insurance coverages as set forth herein, naming Licensor as an additional insured, and shall require that the subcontractor shall release, defend and indemnify Licensor to the same extent and under the same terms and conditions as Licensee is required to release, defend and indemnify Licensor herein.

Failure to provide evidence as required by this section shall entitle, but not require, Licensor to terminate this License immediately. Acceptance of a certificate that does not comply with this section shall not operate as a waiver of Licensee's obligations hereunder.

The fact that insurance (including, without limitation, self-insurance) is obtained by Licensee shall not be deemed to release or diminish the liability of Licensee including, without limitation, liability under the indemnity provisions of this License. Damages recoverable by Licensor shall not be limited by the amount of the required insurance coverage.

For purposes of this section, Licensor shall mean "Burlington Northern Santa Fe Corporation", "BNSF Railway Company" and the subsidiaries, successors, assigns and affiliates of each.

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storage tank, as defined by Environmental Laws on the Premises. Licensee shall not release or suffer the release of oil or hazardous substances, as defined by Environmental Laws on or about the Premises.

- (b) Licensee shall give Licensor immediate notice to Licensor's Resource Operations Center at (800) 832-5452 of any release of hazardous substances on or from the Premises, violation of Environmental Laws, or inspection or inquiry by governmental authorities charged with enforcing Environmental Laws with respect to Licensee's use of the Premises. Licensee shall use the best efforts to promptly respond to any release on or from the Premises. Licensee also shall give Licensor immediate notice of all measures undertaken on behalf of Licensee to investigate, remediate, respond to or otherwise cure such release or violation.
- (c) Licensee recognizes and assumes all responsibility for all present and future environmental obligations imposed under applicable Environmental Laws, regulations or other such requirements relating to contamination of the Premises or groundwater thereunder arising from, caused by, contributed to, or in any way growing out of Licensee's operations. Licensee further agrees to undertake at its sole cost and expense any cleanup of any contamination of the Premises and groundwater thereunder arising from, caused by, contributed to, or in any way growing out of Licensee's operations as required by applicable laws and regulations.
- (d) Licensee agrees to waive any and all statutes of limitations applicable to any controversy or dispute arising out of Section 20(c), and Licensee further agrees that it will not raise or plead a statute of limitations defense against Licensor in any action arising out of Licensees' failure to comply with the preceding subsection.
- (e) In the event that Licensor has notice from Licensee or otherwise of a release or violation of Environmental Laws on the Premises which occurred or may occur during the term of this License, Licensor may require Licensee, at Licensee's sole risk and expense, to take timely measures to investigate, remediate, respond to or otherwise cure such release or violation affecting the Premises or Licensor's right-of-way.
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- (g) Licensee will promptly transmit to Licensor copies of all reports, data boring logs, well completion and other information obtained from all operations on the Premises to Licensor's Remediation Manager. Licensor shall have the option to

obtain split samples and otherwise have reasonable access to the groundwater monitoring well(s) subject to this License for the purpose of obtaining samples or other information from the monitoring well(s). Licensee shall also advise Licensors of any applicable health and safety plans or other similar programs in effect with respect to the operations on the Premises.

- (h) Unless otherwise required by applicable law, Licensee shall keep confidential and shall not disclose any reports, data boring logs, well completion and any other information obtained in connection with this License to third parties without the prior written consent of Licensors.

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If to Licensors: Staubach Global Services - RR, Inc.  
3017 Lou Menk Drive, Suite 100  
Fort Worth, TX 76131  
Attn: Licenses/Permits

with a copy to: BNSF Railway Company  
2500 Lou Menk Dr. – AOB3  
Fort Worth, TX 76131  
Attn: Senior Manager Real Estate

with a copy to: BNSF Remediation Manager  
2454 Occidental Ave., 1A  
Seattle, WA 98134

If to Licensee:           Stantec Consulting Corp.  
                                  9400 S.W. Barnes Rd., Suite 200  
                                  Portland, OR 97225

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31.     All questions concerning the interpretation or application of provisions of this License shall be decided according to the substantive laws of the State of Texas without regard to conflicts of law provisions.

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### **INTEGRATION**

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[Intentionally left blank]

35. The waiver by Licensor of the breach of any provision herein by Licensee shall in no way impair the right of Licensor to enforce that provision for any subsequent breach thereof.

Staubach Global Services – RR, Inc. is acting as representative for BNSF Railway Company.

**IN WITNESS WHEREOF**, this License has been duly executed, in duplicate, by the parties hereto as of the day and year first above written.

**BNSF RAILWAY COMPANY**

Staubach Global Services – RR, Inc.,  
its Attorney in Fact  
3017 Lou Menk Drive, Suite 100  
Fort Worth, TX 76131

By: \_\_\_\_\_  
Ed Darter  
Title: Vice President – National Accounts

**STANTEC CONSULTING CORP.**

9400 S.W. Barnes Rd., Suite 200  
Portland, OR 97225

By: \_\_\_\_\_  
Title: \_\_\_\_\_



---

**From:** Sprick, Grant  
**Sent:** Tuesday, February 22, 2011 01:20 AM  
**To:** Trewartha, Mark; Solomon, Rich; Hetrick, Eric G  
**CC:** Lyons, Thomas; Hunter, Brett  
**Subject:** RE: GWET Redesign  
**Attachments:** Willbridge 90% Design RTC 02212011.pdf

Gentlemen, thanks you all for providing these comments and meeting with us in the field to discuss them. Please see the attached response to provided comments. We hope to have a final design for your consideration in the next few weeks. We are just waiting for some key information from the utility.

Best

-grant

Grant V. Sprick | Certified Project Manager I | [grant.sprick@arcadis-us.com](mailto:grant.sprick@arcadis-us.com)  
<<mailto:firstname.lastname@arcadis-us.com>>

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Professional Engineer/PE-OR, 78790  
Professional Engineer/PE-UT, 7684484-2202

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Please consider the environment before printing this email.

From: Trewartha, Mark [<mailto:Mark.Trewartha@stantec.com>]  
Sent: Friday, January 07, 2011 4:03 PM  
To: Sprick, Grant; 'Solomon, Rich'  
Cc: Lyons, Thomas  
Subject: RE: GWET Redesign

Grant,

See attached memo for comments and/or concerns regarding our review of the GWET 90% drawings.

Let me know if you have any questions.

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
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From: Sprick, Grant [mailto:Grant.Sprick@arcadis-us.com]  
Sent: Wednesday, December 01, 2010 11:16 AM  
To: 'Solomon, Rich'; Trewartha, Mark  
Cc: Lyons, Thomas  
Subject: FW: GWET Redesign

I apologize that you didn't get this originally, perhaps the file is too big. Let's do another test run. Original email is below.

-Grant

Grant V. Sprick | Certified Project Manager I | grant.sprick@arcadis-us.com  
<mailto:firstname.lastname@arcadis-us.com>

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Professional Engineer/PE-OR, 78790  
Professional Engineer/PE-UT, 7684484-2202

ARCADIS, Imagine the result

Please consider the environment before printing this email.

From: Sprick, Grant  
Sent: Wednesday, November 17, 2010 10:11 PM  
To: Trewartha, Mark; Solomon, Rich; Lyons, Thomas  
Cc: BHunter@chevron.com  
Subject: RE: GWET Redesign

Rich, Tom and Mark, thanks again for the provided responses (10/28 email below). I've prepared some follow up comments to your responses. They are provided below by original comment number.

3) You are correct, the system at this point does not recover much product. As such, I do not think NAPL management will be an issue.

4) Instead of trenching a new discharge line to the sanitary sewer, ARCADIS proposes to use the existing discharge connection. This would limit the amount of trenching near and underneath

**COP0020148**

ConocoPhillips pipelines in NW Front Ave. We will use existing conduit underneath the pipelines near the existing location of the treatment system to route treated water to the discharge point.

5) The size of the secondary containment is small enough that minimal disturbance to the monitoring well network is needed.

6) ARCADIS is preparing a geotechnical evaluation near the retaining wall to verify that loads associated with the new system will not impact the retaining wall stability. The results of that evaluation will be provided under separate cover.

We have taken the guidance provided on October 28 and prepared a 90% design package illustrating the proposed layout. Attached I have provided a copy our 90% design for your consideration. There is no deadline for review, but I would appreciate your comments before the end of the year if possible. There are a few key points that I would like to highlight.

1) Solar Power - we are proposing to use solar power to operate the majority of the system components. The system will still need to be hooked into the current power service, but we are hoping to offset energy demand. To achieve this, we would need to install solar panels on the roof of the asphalt shed. I think this would great visible green remediation.

I understand that roof materials were recently replaced. Are there roof truss structure specifications available for review? Should this be acceptable to you, I'd like to understand construction of the roof and materials used prior to moving forward with this alternative.

2) Discharge Location - As stated above, we are proposing to use the existing discharge piping as opposed to installing a new connection to the sanitary sewer line. Reasons for this proposal include:

- a. Avoid the need to trench near and underneath ConocoPhillips pipelines
- b. Avoid the need for additional permits
- c. Cost control

Following receipt of your comments and suggestions, we will incorporate into a final design that will be used for subcontractor costing. Feel free to contact me with questions whenever you want to. I will reach out to all of you in the next few weeks to see if you have any preliminary questions.

Regards

-Grant

Grant V. Sprick | Certified Project Manager I | [grant.sprick@arcadis-us.com](mailto:grant.sprick@arcadis-us.com)  
<<mailto:firstname.lastname@arcadis-us.com>>

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Professional Engineer/PE-OR, 78790  
Professional Engineer/PE-UT, 7684484-2202

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Please consider the environment before printing this email.

From: Trewartha, Mark [<mailto:Mark.Trewartha@stantec.com>]

Sent: Thursday, October 28, 2010 10:12 AM  
To: Sprick, Grant  
Cc: Solomon, Rich; Lyons, Thomas; BHunter@chevron.com  
Subject: GWET Redesign

Grant,

The attached memo is in response to your questions and concerns associated with the redesign and placement of the groundwater extraction and treatment (GWET) system. The questions and concerns were outlined in an email sent on October 7, 2010.

Let me know if you have any questions.

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
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Subject:

Response to Comments for the Groundwater Extraction and Treatment System 90% Design Drawings.

ENVIRONMENT

Dear Mr. Trewartha:

Date:  
February 21, 2011

ARCADIS U.S., Inc. (ARCADIS) is pleased to provide this Response to Comments on the Groundwater Extraction and Treatment (GWET) System 90% Design Drawings. Stantec provided comments on January 7, 2011. For ease of review, each of the comments is provided below followed by ARCADIS' respective response.

Contact:  
Grant V. Sprick  
  
Phone:  
503.220.8201 x1104

#### **General Comments**

Email:  
[Grant.Sprick@arcadis-us.com](mailto:Grant.Sprick@arcadis-us.com)

**Comment 1:** Sheet E-2 shows a service feed (from MCC). What is MCC? Is the power feed for the new system compatible with what was in place for the old system?

Our ref:  
B0045452.0011.00500  
B0046601.0003.00500

**Response:** MCC is used to abbreviate Motor Control Center. The existing power feed was adequate for the proposed GWET system, however, additional upgrades at the facility are planned by ConocoPhillips that will utilize the capacity of the existing power drop. ARCADIS is working with PG&E to discuss upgrading the service or providing a new power feed from NW Front Avenue.

**Comment 2:** If 3 Phase is not available, who is responsible for getting it to the site and how?

**Response:** The existing service drop is 3 phase.

**Comment 3:** No power poles will be allowed to be installed. Electrical should be overhead on cable tray or below ground. Routing of electrical should be at right angles.

Imagine the result

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**COP0020151**

**Response:** We discussed this during our onsite meeting on February 4, 2011 and agreed that power poles were not going to be a problem.

**Comment 4:** *A structural evaluation will be required before placement of solar panels on asphalt shed will be considered by ConocoPhillips. Alternatively, can solar panels be placed on conex box?*

**Response:** A structural analyses was prepared and the existing asphalt shed roof will not support the weight of the standard crystalline solar panels. A write up of the evaluation results will be provided under separate cover. Other options are currently being evaluated and will be discussed with ConocoPhillips prior to selection.

**Comment 5:** *Recovery piping for product collection should be double walled/have secondary containment.*

**Response:** Conveyance piping from the extraction wells to the treatment shed will remain as is. Product lines between the oil water separator and oil batch tank will be double walled. Conveyance piping for treated discharge water will be single walled with no secondary containment.

**Comment 6:** *Subsurface galvanized steel air line should be wrapped with moisture proof tape to prevent corrosion.*

**Response:** Proposed additional galvanized steel air lines will be wrapped with moisture proof tape. Existing air lines will not be upgraded.

**Comment 7:** *Aboveground piping should be steel, not PVC.*

**Response:** The drawings have been updated to show steel pipe instead of PVC.

### **Specifics**

**Comment 1:** *Sheet G-1, bullet # 6 – QED AP4B is specified, is that the long body (54") or short body (40").*

**Response:** The pump is the 40-inch short body. The specifications in the general notes will be updated.

**Comment 2:** Sheet G-1, bullet # 14 - need to specify the flow meters and flow rate capabilities.

**Response:** The effluent flow meter specified is a 1-inch Badger M-Series Mag Meter with a model M-2000 digital display. The flow range is 0.3-93 gallons per minute.

**Comment 3:** Sheet G-1, bullet # 26 – confirm that compaction is as specified in concrete notes on S-1.

**Response:** Bullet #26 was updated to note that compaction is specified in the concrete notes on S-1.

**Comment 4:** Sheet G-1, will contaminated soil be generated during subcutting? If yes, should provide contingency for it.

**Response:** Impacted soils will most likely not be generated during system installation. There is minimal trenching and grading required. Based on existing boring logs and understanding of the site, depths of trenching would not intersect impacted soils.

**Comment 5:** Sheet G-5, confusion about the conduits running below the words 'treated' and 'untreated'. Please clarify.

**Response:** Untreated water is now labeled "UTW". Treated water lines are labeled "W".

**Comment 6:** Sheet M-1, no detail on the equipment (i.e. B-310 blower, OWS-201 air compressor, AC-100 air compressor) is presented.

**Response:** Equipment details have been updated and provided in G-1.

**Comment 7:** Sheet M-1, is the size and layout of the compound and conex box based on equipment sizing from the manufacturer?

**Response:** The equipment layout is based on the size of the equipment per manufacturer cut sheets. Process equipment conveying product was placed on one side of the barrier wall to reduce the requirements of explosion proof equipment. Conex boxes are commonly selected because of pricing and

ease of shipment. The conex box has adequate space for the equipment selected.

**Comment 8:** *Sheet M-1, will the equipment come pre-packaged in the Conex box and ready to hook up or will the equipment be brought in separately and installed in the Conex box – are we sure we've got the compound and Conex box properly sized?*

**Response:** That will be dependent on the subcontractor. Most likely major components will be installed onsite to prevent potential damage during transport of the conex box.

**Comment 9:** *Sheet M-2, drawings show a contingency carbon tank for wastewater treatment. How would wastewater be delivered to the contingency tank given that it is on the other side of the compound? (Consider moving the conex box to the west side of the pad and therefore have room for wastewater treatment if necessary.)*

**Response:** The conex box has been shifted to the west side of the secondary containment pad. Temporary flexible hosing would be connected to the liquid phase granular activated carbon (LPGAC) vessel via cam-lock connections that have been added to the system design. The pressure drop through the LPGAC and additional elevation head only account for a total dynamic head increase of approximately 4 feet. The pump will be sized appropriately to account for this minimal increase.

**Comment 10:** *Sheet M-3, what about secondary containment? Is the lip on the concrete pad sufficient?*

**Response:** The lip on the concrete pad was sized to provide 519 gallons of containment, which only includes the surface area around the conex box for volume. The air sparge tank is the largest unit at 200 gallons of capacity. The oil water separator can hold approximately 120 gallons.

**Comment 11:** *Sheet M-3, where is the sample port on the vent stack from the air sparge tank? There does not appear to be a safe/convenient place to collect a sample.*

**Response:** A sample port has been added to the stack. The top of the tank is 63" which will allow for access to the stack for sampling.



**Comment 12:** Sheet M-3, any thoughts given to heat tracing on pipes to reduce damage during freezing events?

**Response:** The existing GWET system has operated for 10 years without encountering any O&M issues associated with freezing. The heater units have been removed from the design to minimize power consumption/carbon footprint and heat trace will be considered during cold weather months.

**Comment 13:** Sheet E-2 and E-3, we have no problem as long as the DSC-2 circuit breaker/disconnect is within 10 feet of the DSC-1. Alternately the wire between DSC-1 and DSC-2 has to be the same size.

**Response:** Sheets E-2 and E-3 were updated accordingly.

**Comment 14:** Sheet E-2 and E-3, existing design of wireway connections between DSC-1 and transformer load center may not conform to current NEC standards as shown on E-3.

**Response:** Sheets E-2 and E-3 were updated accordingly.

Should you have additional questions or comments, please do not hesitate to contact me via the contact information provided on page 1.

Sincerely,



Grant V. Sprick, P.E.  
Certified Project Manager I

Copies:

Brett Hunter, Chevron EMC  
Tom Lyons, ConocoPhillips  
Eric Hetrick, ConocoPhillips  
Rich Solomon, ConocoPhillips  
Mike Misakian, ARCADIS  
Shawn Burnell, ARCADIS

---

**From:** Lyons, Thomas  
**Sent:** Tuesday, February 22, 2011 05:00 PM  
**To:** Sprick, Grant; Trewartha, Mark; Solomon, Rich; Hetrick, Eric G  
**CC:** Hunter, Brett  
**Subject:** RE: GWET Redesign

Grant

Thanks for your responses to the comments. I'd like a few clarifications:

General Comments:

Comment 3: No power poles will be allowed to be installed. Electrical should be overhead on cable tray or below ground. Routing of electrical should be at right angles.

Response: We discussed this during our onsite meeting on February 4,

2011 and agreed that power poles were not going to be a problem. I don't recall agreeing that the power pole were not going to be a problem?

Specific Comments:

Comment 4: Sheet G-1, will contaminated soil be generated during subcutting? If yes, should provide contingency for it.

Response: Impacted soils will most likely not be generated during system installation. There is minimal trenching and grading required. Based on existing boring logs and understanding of the site, depths of trenching would not intersect impacted soils. Excavation will be managed according to the Portland City agreement.

Comment 10: Sheet M-3, what about secondary containment? Is the lip on the concrete pad sufficient?

Response: The lip on the concrete pad was sized to provide 519 gallons of containment, which only includes the surface area around the conex box for volume. The air sparge tank is the largest unit at 200 gallons of capacity.

The oil water separator can hold approximately 120 gallons. What about the capacity of the contingency tank? Will the containment be sufficient if that capacity is included?

Comment 12: Sheet M-3, any thoughts given to heat tracing on pipes to reduce damage during freezing events?

Response: The existing GWET system has operated for 10 years without

encountering any O&M issues associated with freezing. The heater units have been removed from the design to minimize power consumption/carbon footprint and heat trace will be considered during cold weather months. Delta has had freeze breakage on their pumps, etc. previously. The Terminal routinely has to freeze-protect our lines during cold weather. Removing the heater units would be a mistake; sooner or later the pumps or lines in that building will crack due to cold weather.

Thanks,  
Tom Lyons  
503-248-1572

---

From: Sprick, Grant [mailto:Grant.Sprick@arcadis-us.com]  
Sent: Monday, February 21, 2011 5:20 PM  
To: Trewartha, Mark; Solomon, Rich; Hetrick, Eric G  
Cc: Lyons, Thomas; Hunter, Brett  
Subject: RE: GWET Redesign

Gentlemen, thanks you all for providing these comments and meeting with us in the field to discuss them. Please see the attached response to provided comments. We hope to have a final design for your consideration in the next few weeks. We are just waiting for some key information from the utility.

Best  
-grant

Grant V. Sprick | Certified Project Manager I | grant.sprick@arcadis-us.com  
<mailto:firstname.lastname@arcadis-us.com>

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Professional Engineer/PE-OR, 78790  
Professional Engineer/PE-UT, 7684484-2202

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Please consider the environment before printing this email.

From: Trewartha, Mark [mailto:Mark.Trewartha@stantec.com]  
Sent: Friday, January 07, 2011 4:03 PM  
To: Sprick, Grant; 'Solomon, Rich'  
Cc: Lyons, Thomas  
Subject: RE: GWET Redesign

Grant,

**COP0020157**

See attached memo for comments and/or concerns regarding our review of the GWET 90% drawings.

Let me know if you have any questions.

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
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From: Sprick, Grant [mailto:Grant.Sprick@arcadis-us.com]  
Sent: Wednesday, December 01, 2010 11:16 AM  
To: 'Solomon, Rich'; Trewartha, Mark  
Cc: Lyons, Thomas  
Subject: FW: GWET Redesign

I apologize that you didn't get this originally, perhaps the file is too big. Let's do another test run. Original email is below.

-Grant

Grant V. Sprick | Certified Project Manager I | [grant.sprick@arcadis-us.com](mailto:grant.sprick@arcadis-us.com)  
<<mailto:firstname.lastname@arcadis-us.com>>

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Professional Engineer/PE-OR, 78790  
Professional Engineer/PE-UT, 7684484-2202

ARCADIS, Imagine the result

**COP0020158**

Please consider the environment before printing this email.

From: Sprick, Grant  
Sent: Wednesday, November 17, 2010 10:11 PM  
To: Trewartha, Mark; Solomon, Rich; Lyons, Thomas  
Cc: BHunter@chevron.com  
Subject: RE: GWET Redesign

Rich, Tom and Mark, thanks again for the provided responses (10/28 email below). I've prepared some follow up comments to your responses. They are provided below by original comment number.

- 3) You are correct, the system at this point does not recover much product. As such, I do not think NAPL management will be an issue.
- 4) Instead of trenching a new discharge line to the sanitary sewer, ARCADIS proposes to use the existing discharge connection. This would limit the amount of trenching near and underneath ConocoPhillips pipelines in NW Front Ave. We will use existing conduit underneath the pipelines near the existing location of the treatment system to route treated water to the discharge point.
- 5) The size of the secondary containment is small enough that minimal disturbance to the monitoring well network is needed.
- 6) ARCADIS is preparing a geotechnical evaluation near the retaining wall to verify that loads associated with the new system will not impact the retaining wall stability. The results of that evaluation will be provided under separate cover.

We have taken the guidance provided on October 28 and prepared a 90% design package illustrating the proposed layout. Attached I have provided a copy our 90% design for your consideration. There is no deadline for review, but I would appreciate your comments before the end of the year if possible. There are a few key points that I would like to highlight.

- 1) Solar Power - we are proposing to use solar power to operate the majority of the system components. The system will still need to be hooked into the current power service, but we are hoping to offset energy demand. To achieve this, we would need to install solar panels on the roof of the asphalt shed. I think this would great visible green remediation.

I understand that roof materials were recently replaced. Are there roof truss structure specifications available for review? Should this be acceptable to you, I'd like to understand construction of the roof and materials used prior to moving forward with this alternative.

- 2) Discharge Location - As stated above, we are proposing to use the existing discharge piping as opposed to installing a new connection to the sanitary sewer line. Reasons for this proposal include:
  - a. Avoid the need to trench near and underneath ConocoPhillips pipelines
  - b. Avoid the need for additional permits
  - c. Cost control

Following receipt of your comments and suggestions, we will incorporate into a final design that will be used for subcontractor costing. Feel free to contact me with questions whenever you want to. I will reach out to all of you in the next few weeks to see if you have any preliminary questions.

**COP0020159**

Regards

-Grant

Grant V. Sprick | Certified Project Manager I | [grant.sprick@arcadis-us.com](mailto:grant.sprick@arcadis-us.com)  
<<mailto:firstname.lastname@arcadis-us.com>>

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Professional Engineer/PE-OR, 78790  
Professional Engineer/PE-UT, 7684484-2202

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Please consider the environment before printing this email.

From: Trewartha, Mark [<mailto:Mark.Trewartha@stantec.com>]  
Sent: Thursday, October 28, 2010 10:12 AM  
To: Sprick, Grant  
Cc: Solomon, Rich; Lyons, Thomas; [BHunter@chevron.com](mailto:BHunter@chevron.com)  
Subject: GWET Redesign

Grant,

The attached memo is in response to your questions and concerns associated with the redesign and placement of the groundwater extraction and treatment (GWET) system. The questions and concerns were outlined in an email sent on October 7, 2010.

Let me know if you have any questions.

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
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**COP0020160**

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---

**From:** Trewartha, Mark  
**Sent:** Tuesday, February 22, 2011 04:39 PM  
**To:** Uyeda, Valerie J  
**CC:** Lyons, Thomas; Hetrick, Eric G; Solomon, Rich; Brown, Stanley V; Larsen, Alice; Carlton-Franco, Chris  
**Subject:** RE: Portland Dead Leg Project - digging will occur - need Stantec response  
**Attachments:** RE Pipe Replacement work at the Portland Terminal.htm

Val,

I have notified DEQ of the digging on 2/28.

Regarding soil impacts, Stantec can make a field call on weather soil appears to be contaminated. If not it can be used. If suspected, we will collect samples and would have to wait to get lab results before reusing.

Also, for you information and records, I have attached Mike Romero's (DEQ) response to our notification of digging. His response details what protocols he would like followed for any digging, etc.

Let me know if you have any questions.

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

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**COP0020162**



From: Uyeda, Valerie J [mailto:Valerie.J.Uyeda@conocophillips.com]  
Sent: Monday, February 21, 2011 8:14 AM  
To: Trewartha, Mark  
Cc: Lyons, Thomas; Hetrick, Eric G; Solomon, Rich; Brown, Stanley V  
Subject: RE: Portland Dead Leg Project - digging will occur - need Stantec response

Mark

Please confirm that you gave DEQ preliminary notification that we will start digging on 2/28.

Also, I never did get a response from you as to whether we should assume soil is impacted and dispose immediately or evaluate reuse/disposal options. Please advise. Thank you.

- Val -

---

From: Solomon, Rich  
Sent: Wednesday, February 09, 2011 6:52 AM  
To: Brown, Stanley V; 'Mark.Trewartha@stantec.com'  
Cc: Uyeda, Valerie J; Lyons, Thomas; Hetrick, Eric G  
Subject: Re: Portland Dead Leg Project - digging will occur

Mark,

I think you gave DEQ preliminary notification. Please provide DEQ with this confirmed start date. Once notification is complete please send a confirmation email to everyone on this email.

Thanks  
Rich

---

From: Brown, Stanley V  
To: Solomon, Rich; Trewartha Mark (Mark.Trewartha@stantec.com) <Mark.Trewartha@stantec.com>  
Cc: Uyeda, Valerie J; Lyons, Thomas; Hetrick, Eric G  
Sent: Wed Feb 09 08:42:42 2011  
Subject: RE: Portland Dead Leg Project - digging will occur

Rich did a notification get filed with DEQ for this work? We are planning to kick this project off on Monday February 28th.

Stan Brown

---

From: Solomon, Rich  
Sent: Monday, January 24, 2011 5:17 PM  
To: Trewartha Mark (Mark.Trewartha@stantec.com)  
Cc: Uyeda, Valerie J; Lyons, Thomas; Brown, Stanley V; Hetrick, Eric G  
Subject: FW: Portland Dead Leg Project - digging will occur

Mark,

**COP0020163**

Please review the below email from Val related to an upcoming pipeline removal project at Portland Terminal. Please provide notification to DEQ for the upcoming soil excavation as required by DEQ. Although the exact start date is not yet known you can provide an approximate start date (2/21?). Also please review the attached figures and determine if the pipelines are within areas of known impacts. A decision will need to be made on whether to assume soil is impacted and dispose immediately or store onsite and evaluate reuse/disposal options based on analytical data.

Once notification to DEQ is made please send a confirmation email to everyone on this email.

Thanks,  
Rich

Remember - Safety is not a job; it is a way of life.

Rich Solomon  
Site Manager  
ConocoPhillips  
3900 Kilroy Airport Way, Suite 210  
Long Beach, Ca 90806  
phone: (562) 290-1551  
cell: (714) 224-9921  
email: rich.solomon@conocophillips.com

---

From: Uyeda, Valerie J  
Sent: Monday, January 24, 2011 1:32 PM  
To: Solomon, Rich; Hetrick, Eric G  
Cc: Brown, Stanley V; Lyons, Thomas  
Subject: FW: Portland Dead Leg Project - digging will occur

Rich and Eric:

Here is a heads up that there will some digging at the Portland Terminal to remove pipeline dead legs (pipelines that are not needed). We anticipate digging in 4 distinct locations as highlighted in orange on the attached PDF documents. The aerial overhead shows 4 locations on one document. The other 2 documents show the locations in Tank Farm 1 and Tank Farm 2.

<< File: Expected dig locations for dead leg removal at Portland.pdf >>

As seen in the attached e-mails, Stantec is supposed to give Mike Romero, DEQ, 5 days notice that it will be digging. Stan Brown is the project manager on this. Please let Stantec know that we plan to do some digging so that DEQ can be notified. If you need a precise date, then please contact Stan in another few weeks when the project kicks off. We would like to do the notification now, if possible, so we don't hold up the project waiting for 5 days to pass after notification.

<< File: RE construction work at the terminal.msg >> << Message: Soil reuse >>

If the Terminal wants to reuse the soil, then Stantec wants us to contract directly with them for the sampling and analysis. At this point, we do not know how much soil will be generated as we are unsure of how far they will need to dig to unearth the pipelines. If these areas are in areas of known contamination, then we would dispose of this soil at an approved landfill. Based on the location of these dig, should we just plan to dispose of this soil?

Please let me if any additional information is needed at this time. Thanks.

- Val -

---

From: Brown, Stanley V  
Sent: Monday, January 24, 2011 9:21 AM  
To: Uyeda, Valerie J  
Subject: FW: Portland Dead Leg Project

Val,  
Just an FYI we are in the process of scheduling this work at Portland. At this time I do not have a start date, but would hope to have this project going in the next few weeks if possible. There will be some digging involved with this project, which will be field determined once we get going. I know at Portland we have digging restrictions, is there something I need to do to prepare for this work? Call if you need to talk. Thanks.

**COP0020164**

Stan Brown  
ConocoPhillips  
Major Maintenance Superintendant  
562-290-1548-Office  
310-345-6776-Cell

---

From: Edwards, Scott S  
Sent: Monday, January 24, 2011 8:50 AM  
To: Brown, Stanley V  
Cc: Devito, Mike J  
Subject: FW: Portland Dead Leg Project

This looks great-- please do forward to Brinderson for an estimate. Thanks,  
  
Scott

---

From: Brown, Stanley V  
Sent: Monday, January 24, 2011 8:41 AM  
To: Edwards, Scott S  
Subject: Portland Dead Leg Project

Scott,  
Mike and Butch finished the scope of work for Portland Dead Leg. With your approval I will forward this on to Brinderson to provide an estimate and get this work scheduled. Thanks Mike nice work.

<< File: Portland Dead Leg Pictures.zip >> << File: 2011 Portland Dead Leg SOW .doc >>

Stan Brown  
ConocoPhillips  
Major Maintenance Superintendant  
562-290-1548-Office  
310-345-6776-Cell

**COP0020165**

**From:** ROMERO Mike [ROMERO.Mike@deq.state.or.us]  
**Sent:** Thursday, February 10, 2011 5:50 PM  
**To:** Trewartha, Mark  
**Cc:** Larsen, Alice; Carlton-Franco, Chris; Solomon, Rich; Hetrick, Eric G  
**Subject:** RE: Pipe Replacement work at the Portland Terminal

Thanks Mark. Just remember to follow the Contaminated Media Management Plan for the site and if any source areas are discovered, be sure to document and record it (pictures, samples, figures). A site figure or map showing the location of the lines should be prepared along with any summary necessary to document waste disposal. Do you know if the lines are currently capped or are they still connected to tanks or what? Also, be sure that the facility has obtained whatever permits are necessary from City of Portland Development Services (i.e. plumbing permits, erosion control plan etc...). Also, make sure to evaluate if the earth moving part of this needs a construction stormwater permit (1200c).

Mike

---

**From:** Trewartha, Mark [mailto:Mark.Trewartha@stantec.com]  
**Sent:** Thursday, February 10, 2011 1:56 PM  
**To:** ROMERO Mike  
**Cc:** Larsen, Alice; Carlton-Franco, Chris; Solomon, Rich; Hetrick, Eric G  
**Subject:** Pipe Replacement work at the Portland Terminal

Mike,

As mentioned during the WTG meeting, the Portland Terminal is planning to remove pipeline dead legs (pipelines that are not needed). The Terminal anticipates digging in 4 distinct locations. The work is scheduled for February 28<sup>th</sup>. Stantec will be onsite to observe and collect samples as necessary.

Let me know if you have any questions.

**Mark Trewartha, R.G.**  
Senior Hydrogeologist  
Stantec Consulting Services Inc.  
9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
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**COP0020166**

**From:** ROMERO Mike [ROMERO.Mike@deq.state.or.us]  
**Sent:** Thursday, February 10, 2011 5:50 PM  
**To:** Trewartha, Mark  
**Cc:** Larsen, Alice; Carlton-Franco, Chris; Solomon, Rich; Hetrick, Eric G  
**Subject:** RE: Pipe Replacement work at the Portland Terminal

Thanks Mark. Just remember to follow the Contaminated Media Management Plan for the site and if any source areas are discovered, be sure to document and record it (pictures, samples, figures). A site figure or map showing the location of the lines should be prepared along with any summary necessary to document waste disposal. Do you know if the lines are currently capped or are they still connected to tanks or what? Also, be sure that the facility has obtained whatever permits are necessary from City of Portland Development Services (i.e. plumbing permits, erosion control plan etc...). Also, make sure to evaluate if the earth moving part of this needs a construction stormwater permit (1200c).

Mike

---

**From:** Trewartha, Mark [mailto:Mark.Trewartha@stantec.com]  
**Sent:** Thursday, February 10, 2011 1:56 PM  
**To:** ROMERO Mike  
**Cc:** Larsen, Alice; Carlton-Franco, Chris; Solomon, Rich; Hetrick, Eric G  
**Subject:** Pipe Replacement work at the Portland Terminal

Mike,

As mentioned during the WTG meeting, the Portland Terminal is planning to remove pipeline dead legs (pipelines that are not needed). The Terminal anticipates digging in 4 distinct locations. The work is scheduled for February 28<sup>th</sup>. Stantec will be onsite to observe and collect samples as necessary.

Let me know if you have any questions.

**Mark Trewartha, R.G.**  
Senior Hydrogeologist  
Stantec Consulting Services Inc.  
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**COP0020167**

---

**From:** Trewartha, Mark  
**Sent:** Tuesday, February 22, 2011 11:31 PM  
**To:** Uyeda, Valerie J  
**CC:** Lyons, Thomas; Hetrick, Eric G; Solomon, Rich; Brown, Stanley V; Larsen, Alice; Carlton-Franco, Chris  
**Subject:** RE: Portland Dead Leg Project - digging will occur - need Stantec response

Thanks Val.

I have a call into Stan to discuss some of what you have brought up. In addition, Stantec will be attending the KO meeting on Monday.

From the work plan Stan forwarded, it appears that digging will be limited to four areas and mainly for the purpose of pipe direction confirmation. At this point, Stantec is assuming we will be onsite for these activities and will be responsible for documenting activities conducted at these times.

Most of the other work outlined in the work plan appears to be aboveground. Ideally for these activities, documentation regarding procedures used to find/open the pipes, documentation of what lines were left in place and which were removed, documentation on containment of product and other liquids evacuated from the pipe, and documentation of capping of the ends should be sufficient. Pictures and a site map showing all the areas would also be beneficial. However, assuming that this work is all aboveground, documentation verifying that no release of product or water from the pipes occurred during these activities would be adequate. I am assuming that overall documentation for the Dead Leg Project will be covered in a report generated by the contractor conducting the work. If so, a copy of this report attached as an amendment to our report on activities observed by Stantec should be sufficient documentation for DEQ.

In addition, if containment is not maintained during activities related to purging product and water from the pipes and Stantec is not onsite, Stantec should be notified. Primary Stantec contact for this work will be Chris Carlton-Franco. Secondary Stantec contact would be myself.

Let me know if you have any questions.

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

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Portland OR 97225-6690  
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**COP0020168**

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From: Uyeda, Valerie J [mailto:Valerie.J.Uyeda@conocophillips.com]  
Sent: Tuesday, February 22, 2011 3:00 PM  
To: Trewartha, Mark  
Cc: Lyons, Thomas; Hetrick, Eric G; Solomon, Rich; Brown, Stanley V; Larsen, Alice; Carlton-Franco, Chris  
Subject: RE: Portland Dead Leg Project - digging will occur - need Stantec response

Mark

This activity should disturb less than 1 acre of soil so no stormwater construction permit will be required.

As for documenting and recording any source areas, can you provide guidance to Stan Brown and Mike DeVito on what documentation you expect. Should the project team make it a point to contact Stantec immediately if contamination is found? If yes, would that be you they should contact? Thanks.

- Val -

---

From: Trewartha, Mark [mailto:Mark.Trewartha@stantec.com]  
Sent: Tuesday, February 22, 2011 8:40 AM  
To: Uyeda, Valerie J  
Cc: Lyons, Thomas; Hetrick, Eric G; Solomon, Rich; Brown, Stanley V; Larsen, Alice; Carlton-Franco, Chris  
Subject: RE: Portland Dead Leg Project - digging will occur - need Stantec response

Val,

I have notified DEQ of the digging on 2/28.

Regarding soil impacts, Stantec can make a field call on whether soil appears to be contaminated. If not it can be used. If suspected, we will collect samples and would have to wait to get lab results before reusing.

Also, for your information and records, I have attached Mike Romero's (DEQ) response to our notification of digging. His response details what protocols he would like followed for any digging, etc.

**COP0020169**

Let me know if you have any questions.

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
Fx: (503) 297-5429  
Cell: (503) 807-8568

stantec.com <<http://www.stantec.com>>

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From: Uyeda, Valerie J [mailto:Valerie.J.Uyeda@conocophillips.com]  
Sent: Monday, February 21, 2011 8:14 AM  
To: Trewartha, Mark  
Cc: Lyons, Thomas; Hetrick, Eric G; Solomon, Rich; Brown, Stanley V  
Subject: RE: Portland Dead Leg Project - digging will occur - need Stantec response

Mark

Please confirm that you gave DEQ preliminary notification that we will start digging on 2/28.

Also, I never did get a response from you as to whether we should assume soil is impacted and dispose immediately or evaluate reuse/disposal options. Please advise. Thank you.

- Val -

---

From: Solomon, Rich  
Sent: Wednesday, February 09, 2011 6:52 AM  
To: Brown, Stanley V; 'Mark.Trewartha@stantec.com'  
Cc: Uyeda, Valerie J; Lyons, Thomas; Hetrick, Eric G

**COP0020170**



Subject: Re: Portland Dead Leg Project - digging will occur

Mark,

I think you gave DEQ preliminary notification. Please provide DEQ with this confirmed start date. Once notification is complete please send a confirmation email to everyone on this email.

Thanks  
Rich

---

From: Brown, Stanley V  
To: Solomon, Rich; Trewartha Mark (Mark.Trewartha@stantec.com) <Mark.Trewartha@stantec.com>  
Cc: Uyeda, Valerie J; Lyons, Thomas; Hetrick, Eric G  
Sent: Wed Feb 09 08:42:42 2011  
Subject: RE: Portland Dead Leg Project - digging will occur

Rich did a notification get filed with DEQ for this work? We are planning to kick this project off on Monday February 28th.

Stan Brown

---

From: Solomon, Rich  
Sent: Monday, January 24, 2011 5:17 PM  
To: Trewartha Mark (Mark.Trewartha@stantec.com)  
Cc: Uyeda, Valerie J; Lyons, Thomas; Brown, Stanley V; Hetrick, Eric G  
Subject: FW: Portland Dead Leg Project - digging will occur

Mark,

Please review the below email from Val related to an upcoming pipeline removal project at Portland Terminal. Please provide notification to DEQ for the upcoming soil excavation as required by DEQ. Although the exact start date is not yet known you can provide an approximate start date (2/21?). Also please review the attached figures and determine if the pipelines are within areas of known impacts. A decision will need to be made on whether to assume soil is impacted and dispose immediately or store onsite and evaluate reuse/disposal options based on analytical data.

Once notification to DEQ is made please send a confirmation email to everyone on this email.

Thanks,  
Rich

Remember - Safety is not a job; it is a way of life.

Rich Solomon  
Site Manager  
ConocoPhillips  
3900 Kilroy Airport Way, Suite 210  
Long Beach, Ca 90806  
phone: (562) 290-1551  
cell: (714) 224-9921  
email: rich.solomon@conocophillips.com

---

From: Uyeda, Valerie J  
Sent: Monday, January 24, 2011 1:32 PM  
To: Solomon, Rich; Hetrick, Eric G  
Cc: Brown, Stanley V; Lyons, Thomas  
Subject: FW: Portland Dead Leg Project - digging will occur

Rich and Eric:

**COP0020171**

Here is a heads up that there will some digging at the Portland Terminal to remove pipeline dead legs (pipelines that are not needed). We anticipate digging in 4 distinct locations as highlighted in orange on the attached PDF documents. The aerial overhead shows 4 locations on one document. The other 2 documents show the locations in Tank Farm 1 and Tank Farm 2.

<< File: Expected dig locations for dead leg removal at Portland.pdf >>

As seen in the attached e-mails, Stantec is supposed to give Mike Romero, DEQ, 5 days notice that it will be digging. Stan Brown is the project manager on this. Please let Stantec know that we plan to do some digging so that DEQ can be notified. If you need a precise date, then please contact Stan in another few weeks when the project kicks off. We would like to do the notification now, if possible, so we don't hold up the project waiting for 5 days to pass after notification.

<< File: RE construction work at the terminal.msg >> << Message: Soil reuse >>

If the Terminal wants to reuse the soil, then Stantec wants us to contract directly with them for the sampling and analysis. At this point, we do not know how much soil will be generated as we are unsure of how far they will need to dig to unearth the pipelines. If these areas are in areas of known contamination, then we would dispose of this soil at an approved landfill. Based on the location of these dig, should we just plan to dispose of this soil?

Please let me if any additional information is needed at this time. Thanks.

- Val -

---

From: Brown, Stanley V  
Sent: Monday, January 24, 2011 9:21 AM  
To: Uyeda, Valerie J  
Subject: FW: Portland Dead Leg Project

Val,  
Just an FYI we are in the process of scheduling this work at Portland. At this time I do not have a start date, but would hope to have this project going in the next few weeks if possible. There will be some digging involved with this project, which will be field determined once we get going. I know at Portland we have digging restrictions, is there something I need to do to prepare for this work? Call if you need to talk. Thanks.

Stan Brown  
ConocoPhillips  
Major Maintenance Superintendent  
562-290-1548-Office  
310-345-6776-Cell

---

From: Edwards, Scott S  
Sent: Monday, January 24, 2011 8:50 AM  
To: Brown, Stanley V  
Cc: Devito, Mike J  
Subject: FW: Portland Dead Leg Project

This looks great-- please do forward to Brinderson for an estimate. Thanks,

Scott

---

From: Brown, Stanley V  
Sent: Monday, January 24, 2011 8:41 AM  
To: Edwards, Scott S  
Subject: Portland Dead Leg Project

Scott,  
Mike and Butch finished the scope of work for Portland Dead Leg. With your approval I will forward this on to Brinderson to provide an estimate and get this work scheduled. Thanks Mike nice work.

<< File: Portland Dead Leg Pictures.zip >> << File: 2011 Portland Dead Leg SOW .doc >>

Stan Brown  
ConocoPhillips  
Major Maintenance Superintendent

**COP0020172**

562-290-1548-Office  
310-345-6776-Cell

---

**From:** Trewartha, Mark  
**Sent:** Wednesday, March 09, 2011 11:16 PM  
**To:** Mozart, Angie (PTS Staffing Solutions)  
**CC:** Peterson, Marc; Carlton-Franco, Chris; Larsen, Alice; Hetrick, Eric G  
**Subject:** RE: AOC Site #0922 (Acq. #0608) Portland, OR

Angie,

We will be most likely using a vacuum truck to clean out some of the sediment that has accumulated inside. Other than that, just some hand tools to collect samples of sediment and/or water.

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
Fx: (503) 297-5429  
Cell: (503) 807-8568

<<http://www.stantec.com>> stantec.com

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From: Mozart, Angie (PTS Staffing Solutions) [mailto:Angie.Mozart@contractor.conocophillips.com]  
Sent: Wednesday, March 09, 2011 3:13 PM  
To: Trewartha, Mark  
Subject: AOC Site #0922 (Acq. #0608) Portland, OR

Mark,

BNSF asked me what tools would be used for sampling the manhole on their property? It will affect potential insurance costs for the license...

Thanks,

**COP0020174**

Angie Mozart

Contracts Associate

Principal Technical Services - Approved service provider of

ConocoPhillips Company, Corporate Real Estate -

Property Tax, Real Estate, Right of Way & Claims (PTRRC)

1232 Park Street, Suite 300

Paso Robles, CA 93446

Phone: (805) 226-2653

angie.mozart@contractor.conocophillips.com

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**COP0020175**

RM&R / PTRRC PROJECT REQUEST & INFORMATION FORM					
RM&R Request Date		3/24/2010		PTRRC Received Date	
RM&R Required Date		TBD		4/9/2010	
		PTRRC Closed Date		<input checked="" type="checkbox"/> NEW <input type="checkbox"/> DEMONSTRATION <input type="checkbox"/> HISTORICAL <input type="checkbox"/> AMENDMENT	
SITE SPECIFIC INFORMATION		SITE MANAGER INFORMATION		ACCOUNTING INFORMATION	
SITE OF OPEN ENVIRONMENTAL CASE		Site Manager		RM&R Site ID#	
Acquisition # (4 digits)		Street Address		WNG. Number	
Street Address		City		Company Code	
City		State, Zip		G/L Account No.	
State and Zip		Office Phone		ENFOS P.O. # Required For Expenditures	
Ownership Status		Cell Number		Purchase Order #	
Heritage Company		Email		Bus. Unit # (6-7 digits)	
CONSULTANT INFORMATION		REGULATORY AGENCY		PROJECT LOCATION	
Company Name		Agency Name		Assessor Parcel #	
Street Address		Agency Location		Street Address	
City		Agency Phone		City	
State and Zip		Agency Contact		State and Zip	
Project Manager		Agency Email		County	
Work Phone				Legal Description: Location is south of the intersection of NW Doane Ave and NW St. Helens Rd on the NE side of	
Email Address: Chris.CarltonFranco@stantec.com					
LANDOWNER 1		LANDOWNER 2 (If Applicable)		TENANT (If Applicable)	
Owner #1 Name		Owner #2 Name		Name	
Street Address		Street Address		Street Address	
City		City		City	
State and Zip		State and Zip		State and Zip	
P.O. Box		P.O. Box		P.O. Box	
P.O. City & Zip		P.O. City & Zip		P.O. City & Zip	
Phone		Phone		Phone	
Contact Thru		Contact Thru			
On Premises?		On Premises?		On Premises?	
LANDOWNER ATTORNEY (If Applicable)		PROPERTY MANAGEMENT (If Applicable)		PTRRC CONTACT	
Law Office		Company		PTRRC Associate	
Attorney		Contact Name		Phone	
Street Address		Street Address		PTRRC Agent	
City		City		City	
State and Zip		State and Zip		Phone	
Phone		Phone		COP Legal	
WORK DESCRIPTION		ACCESS SCOPE		PROJECT INFORMATION	
Agency-required storm water sampling: Need access to BNSF property to collect a sample from MH-9 (see attached figures for location), access required for at least four sampling events		Access Scope		Agreement Type	
		Other:		Start Date	
		Access Restrictions Detail/Other Notes:		Project Duration	
				Access Property Type	
				Other (specify)	
				TOBIN #	
				RW #	
REPORT SUBMITTAL REQUIREMENTS		AGREEMENT INFO (PTRRC AFTER CLOSING)		PRE-NOTIFICATION REQMENTS	
Frequency		Agreement Date		In Advance	
Type		Agmt Expire Date		When	
To Whom		Access Fee		To Whom	
Other		Fee Frequency		Other	
		Property Owner		Form of Notification	
		Tax ID #			
Indicate in which Electronic Data Management System (EDMS) Agreement resides. Upload if Not in EDMS.				<input type="checkbox"/> WEB-X <input type="checkbox"/> LIVELINK	
Required completion by RM&R or its Consultant				Drop-Down Data Selection	

---

**From:** Terry, Ben F.  
**Sent:** Sunday, March 27, 2011 04:13 AM  
**To:** Hetrick, Eric G; Harms, Clint; Trewartha, Mark; Gdak, Chris  
**CC:** Solomon, Rich; Fischman, Dan:  
**Subject:** RE: AOC Site #0922 (Acq. #0608) CVX TRANSITIONING 76 TERMINAL - 5528 NW Doane Ave., Portland, OR  
**Attachments:** Untitled Attachment; Untitled Attachment; Untitled Attachment; Untitled Attachment; BNSF Cover letter\_Application\_Work plan\_Drawings.pdf; 0922(0608) BNSF - Stormwater.xls; Portland Terminal Access Agreement - Chevron - Fully Executed.pdf

Thanks Eric,

We all appreciate your efforts and the attached data package. CEMC will pursue the offsite access agreement beginning on 4/1/2011.

Clint,

Please review the attached files and capture the appropriate comments and action items on the site MOC form. Consult with Mark and Chris as needed. After transition we will collaborate on how we (CEMC/Stantec) will address the offsite access issues.

I request that you distribute to CEMC and COP the updated MOC form by COB Monday.

Thanks,

Ben Terry  
Project Manager

Chevron Environmental Management Company  
Marketing Business Unit  
6101 Bollinger Canyon Road

BR1X 5222

San Ramon, CA 94583  
Tel 925 790 6240  
bfterry@chevron.com <mailto:bfterry@chevron.com>

From: Hetrick, Eric G [mailto:Eric.G.Hetrick@conocophillips.com]  
Sent: Friday, March 25, 2011 8:51 AM  
To: Trewartha, Mark; Gdak, Chris  
Cc: Terry, Ben F.; Solomon, Rich; Fischman, Dan:  
Subject: FW: AOC Site #0922 (Acq. #0608) CVX TRANSITIONING TERMINAL - 5528 NW Doane Ave., Portland, OR

All,

Per our transportation transition discussion last week with Chevron I inquired with PTRRC regarding the status of the offsite access agreement with BNSF. In conversations with PTRRC, it appeared that they were still in the early stages of discussions with BNSF and that the likelihood of procuring the access agreement in the next two weeks (or prior to formal site transition) was slim. Based on this information I asked that PTRRC prepare a package of the information that they have obtained to date so this information can be provided to Chevron/Stantec in the hopes that the momentum that has been recognized in attempting to procure this agreement can be maintained. Please see PTRRC's note below and associated attachments for details and let me know if you have any questions or require any additional information.

**COP0020177**

Best Regards,  
Eric

Eric G. Hetrick  
Site Manager - Risk Management and Remediation  
ConocoPhillips Company  
76 Broadway  
Sacramento, CA 95818  
916-558-7604 (office)  
916-307-3450 (cell)  
916-558-7639 (fax)  
Eric.G.Hetrick@conocophillips.com

RM&R Safety Principles:

- Report to work physically rested and mentally alert.
- Observe and coach your co-workers to ensure that they work safely.
- Do not improvise or take short cuts - follow procedures.
- There is zero tolerance for willful unsafe actions.
- Stop all unsafe work.

---

From: Mozart, Angie (PTS Staffing Solutions)  
Sent: Friday, March 25, 2011 8:36 AM  
To: Hetrick, Eric G  
Cc: Hagemann, Colleen S.  
Subject: AOC Site #0922 (Acq. #0608) CVX TRANSITIONING TERMINAL - 5528 NW Doane Ave., Portland, OR

Eric,

Last week, after realizing the BNSF agreement would not get completed by the end of this month, you requested that I send you the information related to this off-site access agreement in order to transfer this to Chevron. I've attached the following documents regarding the BNSF access agreement that I was working on with Jones Lang LaSalle for access to manhole-9 on the BNSF railroad property adjacent to the Portland Terminal. The numbers below match the attachment order:

Email from Heather Calhoun at Jones Lang LaSalle (JLL), including the Word version of the License for Environmental Access (Tracking #10-41650) from BNSF which was returned to Stantec. This agreement requires a name change that will cost \$600.00. BNSF/JLL initially waived the deposit and contract fee of \$1000.00.

Email dated 3/9/11 from consultant regarding tools that would be used for the sampling. JLL wanted clarification of what was involved; they might be able to waive their standard requirement of \$500.00 railroad protective insurance for this project (per phone call with Heather on 3/8/11).

Email dated 2/10/11 from consultant regarding fax of BNSF's insurance requirements.

Email dated 1/19/11 including Environmental Access Permit response from JLL with original agreement, which includes requirements.

PDF file of original BNSF application submitted to JLL. Later JLL requested that the permit be resubmitted in name of company doing the work - the consultant. Unfortunately it was not clarified at that time that Stantec works on behalf of COP, and since COP is the responsible party, it would need to be in COP's name.

Our PRF for project description and contacts.

Unrelated to the BNSF project, I've attached the Portland Terminal Right of Entry Agreement from COP to Chevron from 2009.

**COP0020178**



Please let me know if you have any questions or if you need anything else.

Regards,

Angie Mozart

Contracts Associate

Principal Technical Services - Approved service provider of

ConocoPhillips Company, Corporate Real Estate -

Property Tax, Real Estate, Right of Way & Claims (PTRRC)

1232 Park Street, Suite 300

Paso Robles, CA 93446

Phone: (805) 226-2653

angie.mozart@contractor.conocophillips.com

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**COP0020179**

RM&R / PTRRC PROJECT REQUEST & INFORMATION FORM					
RM&R Request Date	3/24/2010	PTRRC Received Date	4/9/2010	<input checked="" type="checkbox"/> NEW <input type="checkbox"/> DEMONSTRATION <input type="checkbox"/> HISTORICAL <input type="checkbox"/> AMENDMENT	
RM&R Required Date	TBD	PTRRC Closed Date			
SITE SPECIFIC INFORMATION		SITE MANAGER INFORMATION		ACCOUNTING INFORMATION	
SITE OF OPEN ENVIRONMENTAL CASE		Site Manager		RM&R Site ID# 0922	
Acquisition # (4 digits)	0608	Street Address	3900 Kilroy Airport Way, Ste. 210	WNG. Number	WNG.000.0922.00.AS
Street Address	5528 NW Doane Ave	City	Long Beach	Company Code	01
City	Portland	State, Zip	CA, 90806	G/L Account No.	713000 Rent/Property Fees
State and Zip	Oregon, 97210	Office Phone	562-290-1551	ENFOS P.O. # Required For Expenditures	
Ownership Status	COP Owned	Cell Number		Purchase Order #	
Heritage Company	Conoco	Email	rich.solomon@conocophillips.com	Bus. Unit # (6-7 digits)	0922
CONSULTANT INFORMATION		REGULATORY AGENCY		PROJECT LOCATION	
Company Name	Stantec	Agency Name	Oregon Dept. of Env. Quality	Assessor Parcel #	R315837
Street Address	7730 SW Mohawk Street	Agency Location	Portland, OR	Street Address	
City	Tualatin	Agency Phone	(503) 229-5563	City	Portland
State and Zip	Oregon, 97062	Agency Contact	Mike Romero	State and Zip	OR 97210
Project Manager	Chris Carlton-Franco	Agency Email	Romero.Mike@deq.state.or.us	County	Multnomah
Work Phone	(503) 691-2030 Ext. 148			Legal Description: Location is south of the intersection of NW Doane Ave and NW St. Helens Rd on the NE side of NW Doane Ave	
Email Address:	Chris.CarltonFranco@stantec.com				
LANDOWNER 1		LANDOWNER 2 (If Applicable)		TENANT (If Applicable)	
Owner #1 Name	BNSF	Owner #2 Name		Name	
Street Address	3017 Lou Menk Drive, Ste 100	Street Address		Street Address	
City	Fort Worth	City		City	
State and Zip	Texas, 76131-2800	State and Zip		State and Zip	
P.O. Box		P.O. Box		P.O. Box	
P.O. City & Zip		P.O. City & Zip		P.O. City & Zip	
Phone	(817) 230-2633	Phone		Phone	
Contact Thru	Heather at Jones Lang LaSalle	Contact Thru			
On Premises?	No	On Premises?		On Premises?	
LANDOWNER ATTORNEY (If Applicable)		PROPERTY MANAGEMENT (If Applicable)		PTRRC CONTACT	
Law Office		Company		PTRRC Associate	Colleen Hagemann ARM
Attorney		Contact Name		Phone	805.226.2649
Street Address		Street Address		PTRRC Agent	Randy Booth
City		City		City	Paso Robles
State and Zip		State and Zip		Phone	805.226.2641
Phone		Phone		COP Legal	Paul Hamada
WORK DESCRIPTION		ACCESS SCOPE		PROJECT INFORMATION	
Agency-required storm water sampling: Need access to BNSF property to collect a sample from MH-9 (see attached figures for location), access required for at least four sampling events		Access Scope		Agreement Type	Access
		Other:		Start Date	5/1/2010
		Access Restrictions Detail/Other Notes:		Project Duration	1 year
				Access Property Type	Other
				Other (specify)	Railroad ROW
				TOBIN #	PRW33936
				RW #	
REPORT SUBMITTAL REQUIREMENTS		AGREEMENT INFO (PTRRC AFTER CLOSING)		PRE-NOTIFICATION REQMENTS	
Frequency		Agreement Date		In Advance	
Type		Agmt Expire Date		When	
To Whom		Access Fee		To Whom	
Other		Fee Frequency		Other	
		Property Owner		Form of Notification	
		Tax ID #			
Indicate in which Electronic Data Management System (EDMS) Agreement resides. Upload if Not in EDMS.				<input type="checkbox"/> WEB-X <input type="checkbox"/> LIVELINK	
Required completion by RM&R or its Consultant				Drop-Down Data Selection	



**Angie Mozart**  
Property Tax, Real Estate,  
Right of Way and Claims  
1232 Park Street, Suite 300  
Paso Robles, CA 93446  
Phone (805) 226-2653  
Fax: (805) 239-4410

**Sent Via Certified Mail**

October 12, 2010

Jones Lang LaSalle  
Attn: Permit Services  
3017 Lou Menk Drive, Suite 100  
Fort Worth, TX 76131-2800

**Re: BNSF Railway Application for Environmental Access Permit**  
**South of NW Doane Avenue and St. Helens Road, Portland, OR**  
**AOC Site #: 0922**  
**Acquisition #: 0608**

Permit Services:


ConocoPhillips Company respectfully submits the attached application and supporting documents to request access to BNSF's manhole-9 (MH-9), located near ConocoPhillips' Willbridge Terminal, #0608, which is located at 5528 NW Doane Avenue in Portland, OR. The Oregon Department of Environmental Quality requires ConocoPhillips Company to conduct storm water sampling, which is described in more detail in the attached work plan letter.

In order to meet the requirements of the BNSF Railway Application for Environmental Access Permit, attached are the following:

1. BNSF Railway Application for Environmental Access Permit
2. Work plan letter dated 10/8/2010 from Stantec Consulting to ConocoPhillips' Site Manager, Rich Solomon
3. Exhibit A – Drawing of ConocoPhillips' Willbridge Terminal that includes MH-9 (duplicates)
4. Exhibit B – Drawing depicting MH-9 in more detail (duplicates)
5. Draft in the amount of \$600.00 for processing fee

Please don't hesitate to contact me if you have any questions regarding this Environmental Access Permit application or the scope of work to be performed. My phone number is (805) 226-2653. You may also email me at [angie.mozart@contractor.conocophillips.com](mailto:angie.mozart@contractor.conocophillips.com). Thank you for your assistance and prompt attention to this important environmental matter.

Sincerely,

  
Angie Mozart, Contracts Associate,  
Principal Technical Services - Approved  
Service Provider for ConocoPhillips Company

Enclosures

cc: Rich Solomon, ConocoPhillips Company, *via email*  
Mark Trewartha and Chris Carlton-Franco, Consultants, Stantec Consulting, *via email*



Date: 10/12/2010

## APPLICATION FOR ENVIRONMENTAL ACCESS PERMIT

Jones Lang LaSalle  
Attn: Permit Services  
3017 Lou Menk Dr., Suite 100  
Fort Worth, TX 76131-2800

APPLICANTS TAX I.D./S.S # 73-0400345

Name of company/municipality who will occupy the property: ConocoPhillips Company and Stantec Consulting Corp.

Is this a condemning authority? Yes ☐ No ☒

Name of contact: Mark Trewartha Telephone (503) 297-1631 Fax: (503) 297-5429

State in which incorporated: Delaware If not incorporated, please attach name(s) of owners or partners.

Mailing Address: 9400 SW Barnes Road, Suite 200, Portland, OR Zip Code: 97225

Name or nearest town on railroad: Portland Country: Multnomah State: OR

Railroad Mile Post: + Line Segment:  (please complete, if available)

Location of proposed occupancy: N.W. ¼ Sec: 19 Twsp: 1 North Range: 1 East

Manhole-9 is near track change B-1 of the Burlington Northern Railroad, next to the common shed,  
and between NW St. Helen's Road and the ConocoPhillips' Willbridge Terminal.

Is work to be performed within 50 feet of railroad property? Yes ☒ No ☐ What percentage? 100%

How many feet from the track will the work be performed? 20 - 30

Total cost of project: \$ 10,000

Area to Occupy: Approx. 10 feet by 10 feet

Date of occupancy (from/to): One year from date of issue.

Purpose of Testing? (testing for what?): Oregon Department of Environmental Quality has mandated quarterly storm water sampling and monitoring of Manhole-9 to test for petroleum product related constituents.

IS THIS PROJECT ARRA FUNDED? Yes ☐ No ☒

Is applicant a Railroad Shipper? Yes ☒ No ☐

If yes, BNSF Marketing Rep name and number: Adam Hart (281) 203-5904

Was this service requested by BNSF? Yes ☐ No ☒

If yes, who requested? N/A Requestor Telephone Number: N/A

Is this installation in conjunction with a track or track expansion project? Yes ☐ No ☒

If yes, BNSF contact name and number: N/A

The cost of the Environmental Access permit is \$500.00 for sampling purposes and an additional \$1000.00 for placement of monitoring wells, due when the permit had been signed by the Permittee and is ready to be returned for execution. Also, Railroad Protective Insurance is required. This insurance will be offered when the Permit draft is sent. **APPLICANT IS REQUIRED TO PROVIDE COPY OF PROPOSED WORK PLAN. A \$1000.00 deposit may be required and will be returned once BNSF receives copy of the Final Report.**

Signature: 

Printed Name: Frank L. Nichols

Title: Advisor, Western Region, PTRRC, CRE, ConocoPhillips

Phone Number: (805) 226-2644 Fax: (805) 239-4410

If you would like confirmation of your application  
please print your email address:  
angie.mozart@contractor.conocophillips.com

COP0020182



**Stantec**

Stantec Consulting Corporation  
9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Tel: (503) 297-1631  
Fax: (503) 297-5429

October 08, 2010

Mr. Rich Solomon  
Site Manager  
ConocoPhillips Risk Management and Remediation  
3900 Kilroy Airport Way, Suite 210  
Long Beach, CA 90806

**Reference: MH-9 Storm Water Flow Investigation**

Dear: Mr. Solomon

The following letter is meant to provide a brief description of the MH-9 Storm Water Flow Investigation proposed by Stantec Consulting (Stantec) at the ConocoPhillips Willbridge Terminal (Terminal) in Portland, Oregon. By performing a video survey, Stantec will attempt to determine/verify the entry point of the storm water line, located between the warehouse and lower & upper lube cells, into manholes MH-9 and MH-11 onto Burlington Northern Santa Fe Railroad (BNSF) Property and into the City of Portland storm water system. Prior to initiating a video survey of the lines leading into the manhole, sediment and/or standing storm water will be removed from MH-9 by vacuum truck. Sediment and/or water removed from MH-9 will be transported offsite to an approved recycling or disposal facility.

Subsequently, a remote controlled device equipped with a video camera was used to conduct a real-time inspection of the storm water line connecting to MH-11 in attempt to trace the line draining the lube cell area back onto ConocoPhillips property (see attached figure). The same will be completed for the line connecting Separator-001 to MH-9. A check will also be made to verify that MH-9 and MH-11 are connected, as MH-9 is shown to drain into the City of Portland storm water system through a connection to MH-11.

Please feel free to contact the undersigned with any questions or concerns.

Sincerely,

**STANTEC CONSULTING CORPORATION**

Chris Carlton-Franco, M.Sc.  
Staff Scientist  
Tel: (503) 297-1631  
Fax: (503) 297-5429  
[chris.carltonfranco@stantec.com](mailto:chris.carltonfranco@stantec.com)

Mark Trewartha, R.G.  
Senior Hydrogeologist  
Tel: (503) 297-1631  
Fax: (503) 297-5429  
[mark.trewartha@stantec.com](mailto:mark.trewartha@stantec.com)

Attachment: Figure

c. Mr. Michael Romero, Oregon Department of Environmental Quality, NW Region Cleanup Section, 2020  
SW Fourth Avenue, Suite 400, Portland, Oregon 97201

**COP0020183**



"EXHIBIT A"

"EXHIBIT B"

**COP002018**

---

**From:** Trewartha, Mark  
**Sent:** Wednesday, March 09, 2011 11:16 PM  
**To:** Mozart, Angie (PTS Staffing Solutions)  
**CC:** Peterson, Marc; Carlton-Franco, Chris; Larsen, Alice; Hetrick, Eric G  
**Subject:** RE: AOC Site #0922 (Acq. #0608) Portland, OR

Angie,

We will be most likely using a vacuum truck to clean out some of the sediment that has accumulated inside. Other than that, just some hand tools to collect samples of sediment and/or water.

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
Fx: (503) 297-5429  
Cell: (503) 807-8568

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From: Mozart, Angie (PTS Staffing Solutions) [mailto:[Angie.Mozart@contractor.conocophillips.com](mailto:Angie.Mozart@contractor.conocophillips.com)]  
Sent: Wednesday, March 09, 2011 3:13 PM  
To: Trewartha, Mark  
Subject: AOC Site #0922 (Acq. #0608) Portland, OR

Mark,

BNSF asked me what tools would be used for sampling the manhole on their property? It will affect potential insurance costs for the license...

Thanks,

**COP0020186**



Angie Mozart

Contracts Associate

Principal Technical Services - Approved service provider of

ConocoPhillips Company, Corporate Real Estate -

Property Tax, Real Estate, Right of Way & Claims (PTRRC)

1232 Park Street, Suite 300

Paso Robles, CA 93446

Phone: (805) 226-2653

angie.mozart@contractor.conocophillips.com

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**COP0020187**

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**From:** Trewartha, Mark  
**Sent:** Thursday, February 10, 2011 04:57 PM  
**To:** Mozart, Angie (PTS Staffing Solutions)  
**CC:** Peterson, Marc; Solomon, Rich; Hetrick, Eric G  
**Subject:** FW: Fax  
**Attachments:** 2011\_02\_08\_12\_06\_20.pdf

Angie,

I received this fax from BNSF.

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
Fx: (503) 297-5429  
Cell: (503) 807-8568

<<http://www.stantec.com>> stantec.com

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From: Butler, Nicole  
Sent: Tuesday, February 08, 2011 12:07 PM  
To: Trewartha, Mark  
Subject: Fax

Mark,

Attached is a fax that was just received for you.

Thank you,

**COP0020188**

Nicole Butler  
Administrative Assistant  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631  
Fx: (503) 297-5429  
Nicole.Butler@Stantec.com

<<http://www.stantec.com>> stantec.com

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**COP0020189**



BNSF Railway Company  
Insurance Compliance  
P.O. Box 12010 - BN  
Hemet, CA 92546-8010

P 3032975429

FEBRUARY 08, 2011

ID Number: 10-41597-0  
V296-License-Environmental Access-427012005

Stantec Consulting Corp.  
Mark Trewartha  
9400 Sw Barnes Road, Suite 200  
Portland, OR 97225

Project Location: City: Portland  
State: OR

### **FINAL NOTICE**

#### **SUBJECT: NEW CONTRACT - INSURANCE COVERAGE REQUEST**

We would like to take this opportunity to remind you that our contract states that you must be continuously insured while doing business with BNSF Railway Company. As of the date of this notice, we do not have record of your current insurance information in our files.

It is not necessary to call us. A complete listing of our insurance requirements is shown on the second page of this document. Please discuss this matter with your insurance agent and have them immediately fax a new Certificate of Insurance showing all the required coverages and endorsements to the fax number shown below. If you have questions about this letter or the correct coverages required you may call us at (951) 766-2221.

To avoid possible suspension of your activities with BNSF Railway Company, your new insurance coverage information must be faxed to us within 7 days of the date of this letter.

Sincerely,

Insurance Audit Department

**Please issue certificates for 'any and all contracts.'**  
**Fax your insurance information ONLY to (951) 652-2882.**

BN PNS - 01/04

COP0020190

Contractor Minimum Insurance Requirements

427012005

The Certificate must:

- \* Be an original document - **Binders are not acceptable.**
- \* List all subsidiaries or DBA's covered by the certificate provided.
- \* Provide at least 30 days notice of cancellation.
- \* Show complete insurance carrier names as listed in the A.M. Best Property & Casualty Guide.
- \* All Coverages must be placed with carriers rated not less than A-, VII by A. M. Best & Co.
- \* Include a 3 year tail option on all 'Claims Made' coverages.
- \* Be completed in its entirety and signed.

**Required Cancellation Clause Modification**

The certificate must show 30 days notice of cancellation. The words ' ENDEAVOR TO' and 'BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES' must be removed from the cancellation clause.

**Required Additional Insured Wording**

BNSF Railway and Jones, Lang, Lasalle Global Services must be correctly named as an Additional Insured for Auto and General Liability (per Endorsement 'CG 20 10' 07-04 for GL).

**Primary Coverage**

Any coverage afforded BNSF Railway and Jones, Lang, Lasalle Global Services , the Certificate Holder, as an Additional Insured shall apply as primary and not excess to any insurance issued in the name of BNSF Railway and Jones, Lang, Lasalle Global Services.

**Waiver Of Subrogation:**

The policies must include a specific Waiver of Subrogation rights against BNSF Railway Company.

**COMMERCIAL GENERAL LIABILITY (Occurrence Form) \*:**

Coverage must be endorsed to cover incidents that occur within 50 feet of railroad property. Coverage must specifically reflect that the definition for insured contract has been amended to eliminate the restriction.

\$4,000,000 General Aggregate  
\$2,000,000 Each Occurrence

**COMMERCIAL AUTOMOBILE LIABILITY COVERAGE:**

Must indicate coverage for Any Auto or Owned, Hired or Borrowed, and Non-owned Vehicles

\$1,000,000 Combined Single Limit

**RAILROAD PROTECTIVE COVERAGE:**

\$6,000,000 General Aggregate  
\$2,000,000 Each Occurrence

**WORKERS' COMPENSATION AND EMPLOYERS LIABILITY COVERAGE:**

Statutory Workers' Compensation Insurance

**POLLUTION LIABILITY COVERAGE:**

\$10,000,000 Aggregate  
\$5,000,000 Each Occurrence

---

**From:** Morrow, Bonnie (PTS Staffing Solutions)  
**Sent:** Wednesday, January 19, 2011 11:24 PM  
**To:** Mozart, Angie (PTS Staffing Solutions)  
**Subject:** FW: NEW BNSF PROJECT  
**Importance:** High  
**Attachments:** Environmental Access Permit 10-41597.pdf

The Agreement.

Bonnie Morrow

Bonnie Morrow, Contracts Associate

Principal Technical Services-Approved Service Provider for

ConocoPhillips Co., Corporate Real Estate - Property Tax,

Real Estate, Right of Way & Claims

1232 Park Street, Suite 300

Paso Robles, CA 93446

Phone: (805) 226-2647

Email: bonnie.morrow@contractor.conocophillips.com

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**From:** Hagemann, Colleen S.  
**Sent:** Wednesday, January 19, 2011 12:52 PM  
**To:** Morrow, Bonnie (PTS Staffing Solutions)  
**Subject:** FW: NEW BNSF PROJECT  
**Importance:** High

Hi Bonnie,

Here is the permit we are processing for Mark Trewartha and Rich Solomon. I don't think I received a PRF for this, but will check and assign to you, if so.

Best Regards,

Colleen

Colleen Hagemann  
ConocoPhillips Company  
Western Region - PTRRC  
Phone: 805.226.2649  
Cell #: 805.405.3706

COP0020192

From: Trewartha, Mark [mailto:Mark.Trewartha@stantec.com]  
Sent: Tuesday, December 14, 2010 10:26 AM  
To: Hagemann, Colleen S.  
Subject: RE: test

Can you hear me now....

Mark Trewartha, R.G,  
Senior Hydrogeologist  
Stantec Consulting Services Inc.

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
Fx: (503) 297-5429  
Cell: (503) 807-8568

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From: Hagemann, Colleen S. [mailto:Colleen.S.Hagemann@conocophillips.com]  
Sent: Tuesday, December 14, 2010 10:24 AM  
To: Trewartha, Mark  
Subject: test

Thank you,

Colleen

Colleen Hagemann, Contracts Associate  
ConocoPhillips Co., Corporate Real Estate,  
Property Tax, Real Estate, Right of Way & Claims  
1232 Park Street, Suite 300  
Paso Robles, CA 93422  
Phone: 805.226.2649  
Cell : 805.405.3706  
Fax : 805.239.4410

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**COP0020193**

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Thank you.



\*\*\* NOTE: THIS AGREEMENT IS PENDING BNSF OPERATING APPROVAL AND CANNOT BE  
FINALIZED UNTIL WE RECEIVE THEIR APPROVAL. \*\*\*

December 7, 2010

10-41597

Mark Trewartha  
Sr. Hydrogeologist  
Stantec Consulting Corp.  
9400 S.W. Barnes Rd., Suite 200  
Portland, OR 97225

Dear Mr. Trewartha:

Enclosed please find duplicate counterparts of the requested contract for execution by an official authorized to execute contract agreements on behalf of Stantec Consulting Corp. Please execute and **return both copies with original signatures** for completion on part of BNSF Railway Company ("BNSF") to this office.

**You should have been or will be contacted by IDS, the BNSF's Insurance Tracking Company. If you have not, and you have any questions regarding any of the insurance requirements, please contact Aimee Austin, via fax, at 951-652-2882. If you have not done so, please fax the following insurance documents to Ms. Austin:**

1. A Certificate of Insurance as required in the agreement.
2. A **separate policy** for Railroad Protective Liability Insurance as required in the agreement (**ORIGINAL POLICY MUST BE PROVIDED**). BNSF Railway Company will be the only insured party; OR;

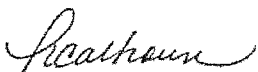
**In lieu of providing a separate policy for Railroad Protective Liability Insurance**, you may participate in the BNSF's Railroad Protective Policy by checking the appropriate box in the contract and including an additional \$500.00 with your check.

Acceptance and deposit of any check by BNSF does not constitute an agreement between BNSF and Licensee for the requested license. BNSF shall not be obligated to hold the check in a separate fund, but may commingle the funds with other funds of BNSF, and in no event shall BNSF be responsible for interest on said funds.

The enclosed permit is not a binding agreement and shall become binding only when, and if, it is executed by you and fully approved and executed by BNSF Railway Company. Upon completion on behalf of BNSF, one fully executed counterpart will be returned for your records.

Please be informed that if contracts, fees, and insurance are not returned within sixty (60) days, a \$600.00 processing fee will be assessed.

Sincerely,



Heather Calhoun  
Sr. Contract Specialist

Enclosures

COP0020195

**LICENSE FOR ENVIRONMENTAL ACCESS**

**THIS LICENSE** ("License"), made as of the \_\_\_\_\_ day of \_\_\_\_\_, 2010 ("Effective Date") by and between **BNSF RAILWAY COMPANY**, a Delaware corporation ("Licensor") and **STANTEC CONSULTING CORP.**, a Delaware corporation ("Licensee").

**NOW THEREFORE**, in consideration of the mutual covenants contained herein, the parties agree to the following:

**GENERAL**

1. Licensor hereby grants Licensee a non-exclusive license, subject to all rights, interests, and estates of third parties, including, without limitation, any leases, licenses, easements, liens or other encumbrances, and upon the terms and conditions set forth below, to use the area of Licensor's property shown on the attached Drawing No. 1-50309, dated October 20, 2010 and revised December 3, 2010, attached hereto, marked Exhibit "A", and made a part hereof, situated at or near Portland, County of Multnomah, State of Oregon, Line Segment 0047, Mile Post 3.86 ("Premises") for the purposes specified in Section 3 below.
2. Licensee shall not disturb any improvements of Licensor or Licensor's existing lessees, licensees, easement beneficiaries or lien holders, if any, or interfere with the use of such improvements.
3. Licensee shall use Premises exclusively as a site for performing environmental and engineering explorations to include one of, or a combination of, the following categories of work:
  - (a) Drilling of soil test borings;
  - (b) Installation of groundwater monitoring wells;
  - (c) Performing groundwater inflow tests on wells;
  - (d) Obtaining groundwater samples from wells;
  - (e) Maintenance and/or checking groundwater level in wells approximately one time per month;
  - (f) Performance of any necessary remediation as determined by Licensor in its sole discretion or by applicable state and/ or federal regulations at Licensee's sole cost and expense. In the event applicable state and/or federal regulations require that the Premises be remediated, Licensee will obtain a No Further Action Letter, Release, or other such equivalent closure document from the state or federal agency having jurisdiction over the remediation of the Premises. Such No Further Action Letter, Release, or other such equivalent closure document shall not be contingent upon or specify the performance of any further work or conditions with respect to the Premises. Licensee warrants that it will conduct quarterly storm water sampling and monitor a manhole to test for petroleum related constituents. Licensee shall not use the Premises for any other purpose whatsoever. Licensee shall not use or store hazardous substances, as defined by the Comprehensive Environmental Response, Compensation, and Liability Act, as amended ("CERCLA") or petroleum or oil as defined by applicable Environmental Laws on the Premises.

4. In case of the eviction of Licensee by anyone owning or claiming title to or any interest in the Premises, Licensors shall not be liable to refund Licensee any compensation paid hereunder or for any damage Licensee sustains in connection therewith.
5. Any contractors or subcontractors performing work on the Premises, or entering the Premises on behalf of Licensee, shall be deemed agents of Licensee for purposes of this License.

### **TERM**

6. This License shall commence on the Effective Date and shall continue for a period of two (2) years, subject to prior termination as hereinafter described.

### **COMPENSATION**

7. (a) The fee for this License has been waived.
- (b) Licensee agrees to reimburse Licensors (within thirty (30) days after receipt of bills therefor) for all costs and expenses incurred by Licensors in connection with Licensee's use of the Premises, including but not limited to the furnishing of Licensors' Flagman and any vehicle rental costs incurred. The cost of flagger services provided by the Railway, when deemed necessary by the Railway's representative, will be borne by the Licensee. The estimated cost for one (1) flagger is \$800.00 for an eight (8) hour basic day with time and one-half or double time for overtime, rest days and holidays. The estimated cost for each flagger includes vacation allowance, paid holidays, Railway and unemployment insurance, public liability and property damage insurance, health and welfare benefits, transportation, meals, lodging and supervision. Negotiations for Railway labor or collective bargaining agreements and rate changes authorized by appropriate Federal authorities may increase actual or estimated flagging rates. The flagging rate in effect at the time of performance by the Contractor hereunder will be used to calculate the actual costs of flagging pursuant to this paragraph.
- (c) All invoices are due thirty (30) days after the date of invoice. In the event that Licensee shall fail to pay any monies due to Licensors within thirty (30) days after the invoice date, then Licensee shall pay interest on such unpaid sum from thirty (30) days after its invoice date to the date of payment by Licensee at an annual rate equal to (i) the greater of (a) for the period January 1 through June 30, the prime rate last published in *The Wall Street Journal* in the preceding December plus two and one-half percent (2 1/2%), and for the period July 1 through December 31, the prime rate last published in *The Wall Street Journal* in the preceding June plus two and one-half percent (2 1/2%), or (b) twelve percent (12%), or (ii) the maximum rate permitted by law, whichever is less.

**COMPLIANCE WITH LAWS**

8. (a) Licensee shall observe and comply with any and all laws, statutes, regulations, ordinances, orders, covenants, restrictions, or decisions of any court of competent jurisdiction ("Legal Requirements") relating to the use of the Premises.
- (b) Prior to entering the Premises, Licensee shall and shall cause its contractor to comply with all Licensors' applicable safety rules and regulations. Prior to commencing any work on the Premises, Licensee shall complete and shall require its contractor to complete the safety-training program at the following Internet Website "<http://contractororientation.com>". This training must be completed no more than one year in advance of Licensee's entry on the Premises.

**DEFINITION OF COST AND EXPENSE**

9. For the purpose of this License, "cost" or "costs" "expense" or "expenses" includes, but is not limited to, actual labor and material costs including all assignable additives, and material and supply costs at current value where used.

**RIGHT OF LICENSOR TO USE**

10. Licensor excepts and reserves the right, to be exercised by Licensor and any other parties who may obtain written permission or authority from Licensor:
  - (a) to maintain, renew, use, operate, change, modify and relocate any existing pipe, power, communication lines and appurtenances and other facilities or structures of like character upon, over, under or across the Premises;
  - (b) to construct, maintain, renew, use, operate, change, modify and relocate any tracks or additional facilities or structures upon, over, under or across the Premises; or
  - (c) to use the Premises in any manner as the Licensor in its sole discretion deems appropriate, provided Licensor uses all commercially reasonable efforts to avoid material interference with the use of the Premises by Licensee for the purpose specified in Section 3 above.

**LICENSEE'S OPERATIONS**

11. (a) Licensee shall notify Licensor's Roadmaster at 1515 W. 39<sup>th</sup> St., Vancouver, Washington 98660, telephone (360) 418-6324 or cell (360) 772-3353, and Licensor's Remediation Manager at 2454 Occidental Ave., 1A, Seattle, Washington 98134, telephone (206) 625-6376, at least ten (10) business days prior to entering the Premises. After completion of use of the Premises for the purpose specified in Section 3, Licensee shall notify Licensor in writing that such use has been completed.

- (b) In performing the work described in Section 3, Licensee shall use only public roadways to cross from one side of Licensor's tracks to the other.
  - (c) Prior to the commencement of any work, Licensee shall submit a workplan to Licensor's Remediation Manager at 2454 Occidental Ave., 1A, Seattle, Washington 98134, telephone (206) 625-6376, for Licensor's review. No work, as set forth in Section 3, may be conducted by Licensee without Licensor's written consent of said workplan for the purpose specified in Section 3. Such review and consent by Licensor shall not constitute the sufficiency or effectiveness of any workplan.
  - (d) No monitoring wells may be installed on the property prior to written approval of Licensee's workplan for the installation of such monitoring wells. Upon obtaining such consent, Licensee shall provide Licensor the location of said well(s) relative to Licensor's nearest trackage, identifying Licensor's nearest Mile Post sign number.
12. Under no conditions shall Licensee be permitted to conduct any tests, investigations or any other activity using mechanized equipment and/or machinery, or place or store any mechanized equipment, tools or other materials, within twenty-five (25) feet of the centerline of any railroad track on the Premises unless Licensee has obtained prior written approval from Licensor. Licensee shall, at its sole cost and expense, perform all activities on and about the Premises in such a manner as not at any time to be a source of danger to or interference with the existence or use of present or future tracks, roadbed or property of Licensor, or the safe operation and activities of Licensor. If ordered to cease using the Premises at any time by Licensor's personnel due to any hazardous condition, Licensee shall immediately do so. Notwithstanding the foregoing right of Licensor, the parties agree that Licensor has no duty or obligation to monitor Licensee's use of the Premises to determine the safe nature thereof, it being solely Licensee's responsibility to ensure that Licensee's use of the Premises is safe. Neither the exercise nor the failure by Licensor to exercise any rights granted in this Section will alter the liability allocation provided by this License.
13. (a) Licensee shall explore the proposed location for such work with hand tools to a depth of at least three (3) feet below the surface of the ground to determine whether pipelines or other structures exist below the surface, provided, however, that in lieu of the foregoing, the Licensee shall have the right to use suitable detection equipment or other generally accepted industry practice (e.g., consulting with the Underground Services Association) to determine the existence or location of pipelines and other subsurface structures prior to drilling or excavating with mechanized equipment. Upon Licensee's written request, which shall be made thirty (30) business days in advance of Licensee's requested entry on the Premises, Licensor will provide Licensee any information that Licensor's Engineering Department has in its possession concerning the existence and approximate location of Licensor's underground utilities and pipelines on the Premises. Prior to conducting any such boring work, the Licensee will review all such material. Licensor does not warrant the accuracy or completeness of information relating to subsurface conditions and Licensee's operations will be subject at all times to the liability provisions herein.

- (b) For all bores greater than 26-inch diameter and at a depth less than 10.0 feet below bottom of rail, a soil investigation will need to be performed by the Licensee and reviewed by Licensor prior to construction. This study is to determine if granular material is present, and to prevent subsidence during the installation process. If the investigation determines in Licensor's reasonable opinion that granular material is present, Licensor may select a new location for Licensee's use, or may require Licensee to furnish for Licensor's review and approval, in its sole discretion a remedial plan to deal with the granular material. Once Licensor has approved any such remedial plan in writing, Licensee shall, at its sole cost and expense, carry out the approved plan in accordance with all terms thereof and hereof.
- 14. Any open hole, boring or well constructed upon Premises by Licensee shall be safely covered and secured at all times when Licensee is not working in the actual vicinity thereof. Following completion of that portion of the work, all holes or borings constructed on the Premises by Licensee shall be:
  - (a) filled in to surrounding ground level with compacted bentonite grout; or
  - (b) otherwise secured or retired in accordance with any applicable Legal Requirement. No excavated materials may remain on the Premises for more than ten (10) days, but must be properly disposed of by Licensee in accordance with applicable Legal Requirements.
- 15. Upon completion of Licensee's work on the Premises or upon termination of this License, whichever shall occur first, Licensee shall, at its sole cost and expense:
  - (a) remove all of its equipment from the Premises;
  - (b) report and restore any damage to the Premises arising from, growing out of, or connected with Licensee's use of the Premises;
  - (c) remedy any unsafe conditions on the Premises created or aggravated by Licensee; and
  - (d) perform any other work to restore the Premises to a useable condition as deemed necessary in Licensor's sole discretion.
- 16. Licensee's on-site supervision shall retain/maintain a fully-executed copy of this License at all times while on the Premises.

### **LIABILITY**

- 17. (a) **TO THE FULLEST EXTENT PERMITTED BY LAW, LICENSEE SHALL RELEASE, INDEMNIFY, DEFEND AND HOLD HARMLESS LICENSOR AND LICENSOR'S AFFILIATED COMPANIES, PARTNERS, SUCCESSORS, ASSIGNS, LEGAL REPRESENTATIVES, OFFICERS, DIRECTORS, SHAREHOLDERS, EMPLOYEES AND AGENTS (COLLECTIVELY, "INDEMNITEES") FOR, FROM AND AGAINST ANY AND ALL CLAIMS, LIABILITIES, FINES, PENALTIES, COSTS, DAMAGES, LOSSES, LIENS,**

**CAUSES OF ACTION, SUITS, DEMANDS, JUDGMENTS AND EXPENSES (INCLUDING, WITHOUT LIMITATION, COURT COSTS, ATTORNEYS' FEES AND COSTS OF INVESTIGATION, REMOVAL AND REMEDIATION AND GOVERNMENTAL OVERSIGHT COSTS) ENVIRONMENTAL OR OTHERWISE (COLLECTIVELY "LIABILITIES") OF ANY NATURE, KIND OR DESCRIPTION OF ANY PERSON OR ENTITY DIRECTLY OR INDIRECTLY ARISING OUT OF, RESULTING FROM OR RELATED TO (IN WHOLE OR IN PART):**

- (i) THIS LICENSE, INCLUDING, WITHOUT LIMITATION, ITS ENVIRONMENTAL PROVISIONS,**
- (ii) ANY RIGHTS OR INTERESTS GRANTED PURSUANT TO THIS LICENSE,**
- (iii) LICENSEE'S OCCUPATION AND USE OF THE PREMISES,**
- (iv) THE ENVIRONMENTAL CONDITION AND STATUS OF THE PREMISES CAUSED BY OR CONTRIBUTED BY LICENSEE, OR**
- (v) ANY ACT OR OMISSION OF LICENSEE OR LICENSEE'S OFFICERS, AGENTS, INVITEES, EMPLOYEES, OR CONTRACTORS, OR ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM, OR ANYONE THEY CONTROL OR EXERCISE CONTROL OVER,**

**EVEN IF SUCH LIABILITIES ARISE FROM OR ARE ATTRIBUTED TO, IN WHOLE OR IN PART, ANY NEGLIGENCE OF ANY INDEMNITEE. THE ONLY LIABILITIES WITH RESPECT TO WHICH LICENSEE'S OBLIGATION TO INDEMNIFY THE INDEMNITEES DOES NOT APPLY ARE LIABILITIES TO THE EXTENT PROXIMATELY CAUSED BY THE GROSS NEGLIGENCE OR WILLFUL MISCONDUCT OF AN INDEMNITEE.**

- (b) FURTHER, TO THE FULLEST EXTENT PERMITTED BY LAW, NOTWITHSTANDING THE LIMITATION IN SECTION 17(a), LICENSEE SHALL NOW AND FOREVER WAIVE ANY AND ALL CLAIMS, REGARDLESS WHETHER BASED ON THE STRICT LIABILITY, NEGLIGENCE OR OTHERWISE, THAT RAILROAD IS AN "OWNER", "OPERATOR", "ARRANGER", OR "TRANSPORTER" WITH RESPECT TO THE PREMISES FOR THE PURPOSES OF CERCLA OR OTHER ENVIRONMENTAL LAWS. LICENSEE WILL INDEMNIFY, DEFEND AND HOLD THE INDEMNITEES HARMLESS FROM ANY AND ALL SUCH CLAIMS REGARDLESS OF THE NEGLIGENCE OF THE INDEMNITEES. LICENSEE FURTHER AGREES THAT THE USE OF THE PREMISES AS CONTEMPLATED BY THIS LICENSE SHALL NOT IN ANY WAY SUBJECT LICENSOR TO CLAIMS THAT LICENSOR IS OTHER THAN A COMMON CARRIER FOR PURPOSES OF ENVIRONMENTAL LAWS AND EXPRESSLY AGREES TO INDEMNIFY, DEFEND, AND HOLD THE INDEMNITEES HARMLESS FOR ANY AND ALL SUCH CLAIMS. IN NO EVENT SHALL LICENSOR BE RESPONSIBLE FOR THE ENVIRONMENTAL CONDITION OF THE PREMISES.**

- (c) TO THE FULLEST EXTENT PERMITTED BY LAW, LICENSEE FURTHER AGREES, REGARDLESS OF ANY NEGLIGENCE OR ALLEGED NEGLIGENCE OF ANY INDEMNITEE, TO INDEMNIFY, AND HOLD HARMLESS THE INDEMNITEES AGAINST AND ASSUME THE DEFENSE OF ANY LIABILITIES ASSERTED AGAINST OR SUFFERED BY ANY INDEMNITEE UNDER OR RELATED TO THE FEDERAL EMPLOYERS' LIABILITY ACT ("FELA") WHENEVER EMPLOYEES OF LICENSEE OR ANY OF ITS AGENTS, INVITEES, OR CONTRACTORS CLAIM OR ALLEGE THAT THEY ARE EMPLOYEES OF ANY INDEMNITEE OR OTHERWISE. THIS INDEMNITY SHALL ALSO EXTEND, ON THE SAME BASIS, TO FELA CLAIMS BASED ON ACTUAL OR ALLEGED VIOLATIONS OF ANY FEDERAL, STATE OR LOCAL LAWS OR REGULATIONS, INCLUDING BUT NOT LIMITED TO THE SAFETY APPLIANCE ACT, THE BOILER INSPECTION ACT, THE OCCUPATIONAL HEALTH AND SAFETY ACT, THE RESOURCE CONSERVATION AND RECOVERY ACT, AND ANY SIMILAR STATE OR FEDERAL STATUTE.
- (d) Upon written notice from Licensor, Licensee agrees to assume the defense of any lawsuit or other proceeding brought against any Indemnitee by any entity, relating to any matter covered by this License for which Licensee has an obligation to assume liability for and/or save and hold harmless any Indemnitee. Licensee shall pay all costs incident to such defense, including, but not limited to, attorneys' fees, investigators' fees, litigation and appeal expenses, settlement payments, and amounts paid in satisfaction of judgments.

#### **PERSONAL PROPERTY WAIVER**

18. ALL PERSONAL PROPERTY, INCLUDING, BUT NOT LIMITED TO, FIXTURES, EQUIPMENT, OR RELATED MATERIALS UPON THE PREMISES WILL BE AT THE RISK OF LICENSEE ONLY, AND NO INDEMNITEE WILL BE LIABLE FOR ANY DAMAGE THERETO OR THEFT THEREOF, WHETHER OR NOT DUE IN WHOLE OR IN PART TO THE NEGLIGENCE OF ANY INDEMNITEE.

#### **INSURANCE**

19. Licensee shall, at its sole cost and expense, procure and maintain during the life of this Agreement the following insurance coverage:
- A. Commercial General Liability Insurance. This insurance shall contain broad form contractual liability with a combined single limit of a minimum of \$2,000,000 each occurrence and an aggregate limit of at least \$ 4,000,000. Coverage must be purchased on a post 1998 ISO occurrence or equivalent and include coverage for, but not limited to, the following:
- ◆ Bodily Injury and Property Damage
  - ◆ Personal Injury and Advertising Injury
  - ◆ Fire legal liability
  - ◆ Products and completed operations



This policy shall also contain the following endorsements, which shall be indicated on the certificate of insurance:

The employee and workers compensation related exclusions in the above policy shall not apply with respect to claims related to railroad employees.

- ◆ The definition of insured contract shall be amended to remove any exclusion or other limitation for any work being done within 50 feet of railroad property.
- ◆ Any exclusions related to the explosion, collapse and underground hazards shall be removed.

No other endorsements limiting coverage may be included on the policy.

- B. Business Automobile Insurance. This insurance shall contain a combined single limit of at least \$1,000,000 per occurrence, and include coverage for, but not limited to the following:
- ◆ Bodily injury and property damage
  - ◆ Any and all vehicles owned, used or hired
- C. Workers Compensation and Employers Liability Insurance. This insurance shall include coverage for, but not limited to:
- ◆ Licensee's statutory liability under the worker's compensation laws of the state(s) in which the work is to be performed. If optional under State law, the insurance must cover all employees anyway.
  - ◆ Employers' Liability (Part B) with limits of at least \$500,000 each accident, \$500,000 by disease policy limit, \$500,000 by disease each employee.
- D. Railroad Protective Liability Insurance. This insurance shall name only the Licensor as the Insured with coverage of at least \$2,000,000 per occurrence and \$6,000,000 in the aggregate. The coverage obtained under this policy shall only be effective during the initial environmental testing and/or exploration. If further exploration and testing is needed at a later date, an additional Railroad Protective Liability Insurance Policy shall be required. The policy shall be issued on a standard ISO form CG 00 35 10 93 and include the following:
- ◆ Endorsed to include the Pollution Exclusion Amendment (ISO form CG 28 31 10 93)
  - ◆ Endorsed to include the Limited Seepage and Pollution Endorsement.
  - ◆ Endorsed to include Evacuation Expense Coverage Endorsement.
  - ◆ No other endorsements restricting coverage may be added.
  - ◆ The original policy must be provided to the Licensor prior to performing any work or services under this Agreement

In lieu of providing a Railroad Protective Liability Policy, Licensee may participate in Licensor's Blanket Railroad Protective Liability Insurance Policy available to Licensee or its contractor. The limits of coverage are the same as above. The cost is \$500.00.

- ☐ I **elect** to participate in Licensor's Blanket Policy;
- ☐ I **elect not** to participate in Licensor's Blanket Policy.

**Other Requirements:**

Where allowable by law all policies (applying to coverage listed above) shall contain no exclusion for punitive damages and certificates of insurance shall reflect that no exclusion exists.

Licensee agrees to waive its right of recovery against Licensor for all claims and suits against Licensor. In addition, its insurers, through policy endorsement, waive their right of subrogation against Licensor for all claims and suits. The certificate of insurance must reflect waiver of subrogation endorsement. Licensee further waives its right of recovery, and its insurers also waive their right of subrogation against Licensor for loss of its owned or leased property or property under its care, custody, or control.

Licensee's insurance policies through policy endorsement must include wording which states that the policy shall be primary and non-contributing with respect to any insurance carried by Licensor. The certificate of insurance must reflect that the above wording is included in evidenced policies.

All policy(ies) required above (excluding Workers Compensation and if applicable, Railroad Protective) shall include a severability of interest endorsement and shall name Licensor and Staubach Global Services - RR, Inc. as an additional insured with respect to work performed under this agreement. Severability of interest and naming Licensor and Staubach Global Services - RR, Inc. as additional insureds shall be indicated on the certificate of insurance.

Licensee is not allowed to self-insure without the prior written consent of Licensor. If granted by Licensor, any deductible, self-insured retention or other financial responsibility for claims shall be covered directly by Licensee in lieu of insurance. Any and all Licensor liabilities that would otherwise, in accordance with the provisions of this Agreement, be covered by Licensee's insurance will be covered as if Licensee elected not to include a deductible, self-insured retention, or other financial responsibility for claims.

Prior to commencing the Work, Licensee shall furnish to Licensor an acceptable certificate(s) of insurance including an original signature of the authorized representative evidencing the required coverage, endorsements, and amendments. The policy(ies) shall contain a provision that obligates the insurance company(ies) issuing such policy(ies) to notify Licensor in writing at least 30 days prior to any cancellation, non-renewal, substitution or material alteration. This cancellation provision shall be indicated on the certificate of insurance. In the event of a claim or lawsuit involving Railroad arising out of this agreement, Licensee will make available any required policy covering such claim or lawsuit.

Any insurance policy shall be written by a reputable insurance company acceptable to Licensor or with a current Best's Guide Rating of A- and Class VII or better, and authorized to do business in the state(s) in which the service is to be provided.

Licensee represents that this License has been thoroughly reviewed by Licensee's insurance agent(s)/broker(s), who have been instructed by Licensee to procure the insurance coverage required by this Agreement. Allocated Loss Expense shall be in addition to all policy limits for coverages referenced above.

Not more frequently than once every five years, Licensor may reasonably modify the required insurance coverage to reflect then-current risk management practices in the railroad industry and underwriting practices in the insurance industry.

If any portion of the operation is to be subcontracted by Licensee, Licensee shall require that the subcontractor shall provide and maintain insurance coverages as set forth herein, naming Licensor as an additional insured, and shall require that the subcontractor shall release, defend and indemnify Licensor to the same extent and under the same terms and conditions as Licensee is required to release, defend and indemnify Licensor herein.

Failure to provide evidence as required by this section shall entitle, but not require, Licensor to terminate this License immediately. Acceptance of a certificate that does not comply with this section shall not operate as a waiver of Licensee's obligations hereunder.

The fact that insurance (including, without limitation, self-insurance) is obtained by Licensee shall not be deemed to release or diminish the liability of Licensee including, without limitation, liability under the indemnity provisions of this License. Damages recoverable by Licensor shall not be limited by the amount of the required insurance coverage.

For purposes of this section, Licensor shall mean "Burlington Northern Santa Fe Corporation", "BNSF Railway Company" and the subsidiaries, successors, assigns and affiliates of each.

## **ENVIRONMENTAL**

20. (a) Licensee shall strictly comply with all federal, state and local environmental laws and regulations in its use of the Premises, including, but not limited to, the Resource Conservation and Recovery Act, as amended (RCRA), the Clean Water Act, the Oil Pollution Act, the Hazardous Materials Transportation Act, CERCLA (collectively referred to as the "Environmental Laws"). Licensee shall not maintain a treatment, storage, transfer or disposal facility, or underground storage tank, as defined by Environmental Laws on the Premises. Licensee shall not release or suffer the release of oil or hazardous substances, as defined by Environmental Laws on or about the Premises.
- (b) Licensee shall give Licensor immediate notice to Licensor's Resource Operations Center at (800) 832-5452 of any release of hazardous substances on or from the Premises, violation of Environmental Laws, or inspection or inquiry by governmental authorities charged with enforcing Environmental Laws with respect to Licensee's use of the Premises. Licensee shall use the best efforts to promptly respond to any release on or from the Premises.

Licensee also shall give Licensor immediate notice of all measures undertaken on behalf of Licensee to investigate, remediate, respond to or otherwise cure such release or violation.

- (c) Licensee recognizes and assumes all responsibility for all present and future environmental obligations imposed under applicable Environmental Laws, regulations or other such requirements relating to contamination of the Premises or groundwater thereunder arising from, caused by, contributed to, or in any way growing out of Licensee's operations. Licensee further agrees to undertake at its sole cost and expense any cleanup of any contamination of the Premises and groundwater thereunder arising from, caused by, contributed to, or in any way growing out of Licensee's operations as required by applicable laws and regulations.
- (d) Licensee agrees to waive any and all statutes of limitations applicable to any controversy or dispute arising out of Section 20(c), and Licensee further agrees that it will not raise or plead a statute of limitations defense against Licensor in any action arising out of Licensees' failure to comply with the preceding subsection.
- (e) In the event that Licensor has notice from Licensee or otherwise of a release or violation of Environmental Laws on the Premises which occurred or may occur during the term of this License, Licensor may require Licensee, at Licensee's sole risk and expense, to take timely measures to investigate, remediate, respond to or otherwise cure such release or violation affecting the Premises or Licensor's right-of-way.
- (f) Licensee shall promptly report to Licensor in writing any conditions or activities upon the Premises known to Licensee which create a risk of harm to persons, property or the environment and shall take whatever action is necessary to prevent injury to persons or property arising out of such conditions or activities; provided, however, that Licensee's reporting to Licensor shall not relieve Licensee of any obligation whatsoever imposed on it by this License. Licensee shall promptly respond to Licensor's request for information regarding said conditions or activities.
- (g) Licensee will promptly transmit to Licensor copies of all reports, data boring logs, well completion and other information obtained from all operations on the Premises to Licensor's Remediation Manager. Licensor shall have the option to obtain split samples and otherwise have reasonable access to the groundwater monitoring well(s) subject to this License for the purpose of obtaining samples or other information from the monitoring well(s). Licensee shall also advise Licensor of any applicable health and safety plans or other similar programs in effect with respect to the operations on the Premises.
- (h) Unless otherwise required by applicable law, Licensee shall keep confidential and shall not disclose any reports, data boring logs, well completion and any other information obtained in connection with this License to third parties without the prior written consent of Licensor.

**ALTERATIONS**

21. Licensee may not make any alterations of the Premises or permanently affix anything to the Premises or any buildings or other structures adjacent to the Premises without Licensors' prior written consent.

**NO WARRANTIES**

22. **LICENSOR'S DUTIES AND WARRANTIES ARE LIMITED TO THOSE EXPRESSLY STATED IN THIS LICENSE AND SHALL NOT INCLUDE ANY IMPLIED DUTIES OR IMPLIED WARRANTIES, NOW OR IN THE FUTURE. NO REPRESENTATIONS OR WARRANTIES HAVE BEEN MADE BY LICENSOR OTHER THAN THOSE CONTAINED IN THIS LICENSE. LICENSEE HEREBY WAIVES ANY AND ALL WARRANTIES WITH RESPECT TO THE PREMISES, EXPRESS OR IMPLIED, OR WHICH MAY EXIST BY OPERATION OF LAW OR IN EQUITY, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY, HABITABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

**QUIET ENJOYMENT**

23. **LICENSOR DOES NOT WARRANT ITS TITLE TO THE PROPERTY NOR UNDERTAKE TO DEFEND LICENSEE IN THE PEACEABLE POSSESSION OR USE THEREOF. NO COVENANT OF QUIET ENJOYMENT IS MADE.**

**DEFAULT**

24. If default shall be made in any of the covenants or agreements of Licensee contained in this document, or in case of any assignment or transfer of this License by operation of law, Licensor may, at its option, terminate this License by serving five (5) days' notice in writing upon Licensee. Any waiver by Licensor of any default or defaults shall not constitute a waiver of the right to terminate this License for any subsequent default or defaults, nor shall any such waiver in any way affect Licensor's ability to enforce any Section of this License. The remedy set forth in this Section 24 shall be in addition to, and not in limitation of, any other remedies that Licensor may have at law or in equity.

**TERMINATION**

25. (a) This License may be terminated by Licensor, at any time, by serving ten (10) days' written notice of termination upon Licensee. This License may be terminated by Licensee upon execution of Licensor's Mutual Termination Letter Agreement then in effect. Upon expiration of the time specified in such notice, this License and all rights of Licensee shall absolutely cease.
- (b) Upon termination, should Licensee have installed its monitoring well(s) on the Premises, once Licensee's well(s) are retired, Licensee shall provide Licensor a copy of the closure documents, submitted directly to Licensor's Environmental Remediation Manager at 2454 Occidental Ave., 1A, Seattle, Washington 98134.

26. If Licensee fails to surrender to Licensor the Premises, upon any termination of this License, all liabilities and obligations of Licensee hereunder shall continue in effect until the Premises are surrendered. Termination shall not release Licensee from any liability or obligation, whether of indemnity or otherwise, resulting from any events happening prior to the date of termination.

### **ASSIGNMENT**

27. Neither Licensee, nor the heirs, legal representatives, successors or assigns of Licensee, nor any subsequent assignee, shall assign or transfer this License or any interest herein, without the prior written consent and approval of Licensor, which may be withheld in Licensor's sole discretion.

### **NOTICES**

28. Any notice required or permitted to be given hereunder by one party to the other shall be in writing and the same shall be given and shall be deemed to have been served and given if (i) placed in the United States mail, certified, return receipt requested, or (ii) deposited into the custody of a nationally recognized overnight delivery service, addressed to the party to be notified at the address for such party specified below, or to such other address as the party to be notified may designate by giving the other party no less than thirty (30) days' advance written notice of such change in address.

If to Licensor:           Staubach Global Services - RR, Inc.  
3017 Lou Menk Drive, Suite 100  
Fort Worth, TX 76131  
Attn: Licenses/Permits

with a copy to:       BNSF Railway Company  
2500 Lou Menk Dr. – AOB3  
Fort Worth, TX 76131  
Attn: Senior Manager Real Estate

with a copy to:       BNSF Remediation Manager  
2454 Occidental Ave., 1A  
Seattle, WA 98134

If to Licensee:       Stantec Consulting Corp.  
9400 S.W. Barnes Rd., Suite 200  
Portland, OR 97225

### **SURVIVAL**

29. Neither termination nor expiration will release either party from any liability or obligation under this License, whether of indemnity or otherwise, resulting from any acts, omissions or events happening prior to the date of termination or expiration, or, if later, the date when the Premises are restored to its condition as of the Effective Date.

### **RECORDATION**

30. It is understood and agreed that this License shall not be placed on public record.

### **APPLICABLE LAW**

31. All questions concerning the interpretation or application of provisions of this License shall be decided according to the substantive laws of the State of Texas without regard to conflicts of law provisions.

### **SEVERABILITY**

32. To the maximum extent possible, each provision of this License shall be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this License shall be prohibited by, or held to be invalid under, applicable law, such provision shall be ineffective solely to the extent of such prohibition or invalidity, and this shall not invalidate the remainder of such provision or any other provision of this License.

### **INTEGRATION**

33. This License is the full and complete agreement between Licensor and Licensee with respect to all matters relating to Licensee's use of the Premises, and supersedes any and all other agreements between the parties hereto relating to Licensee's use of the Premises as described herein. However, nothing herein is intended to terminate either any surviving obligation of Licensee or Licensee's obligation to defend and hold Licensor harmless in any prior written agreement between the parties.

### **MISCELLANEOUS**

34. In the event that Licensee consists of two or more parties, all the covenants and agreements of Licensee herein contained shall be the joint and several covenants and agreements of such parties.

[Intentionally left blank]

35. The waiver by Licensor of the breach of any provision herein by Licensee shall in no way impair the right of Licensor to enforce that provision for any subsequent breach thereof.

Staubach Global Services – RR, Inc. is acting as representative for BNSF Railway Company.

**IN WITNESS WHEREOF**, this License has been duly executed, in duplicate, by the parties hereto as of the day and year first above written.

**BNSF RAILWAY COMPANY**

Staubach Global Services – RR, Inc.,  
its Attorney in Fact  
3017 Lou Menk Drive, Suite 100  
Fort Worth, TX 76131

By: \_\_\_\_\_  
Ed Darter  
Title: Vice President – National Accounts \_\_\_\_\_

**STANTEC CONSULTING CORP.**

9400 S.W. Barnes Rd., Suite 200  
Portland, OR 97225

By: \_\_\_\_\_  
Title: \_\_\_\_\_



STANTEC CONSULTING CORP.

SECTION: 19  
TOWNSHIP: 01N  
RANGE: 01E  
MERIDIAN: WILLM



## RIGHT OF ENTRY AGREEMENT

This Agreement ("Agreement") is made and entered into on **July 6, 2009**, by and between ConocoPhillips Company ("Licensor") and **Chevron U.S.A. Inc.** ("Licensee"). Licensor and Licensee, collectively, shall sometimes hereinafter be referred to as the "Parties".

### Recitals

**WHEREAS**, Licensor is the legal and rightful owner of a certain parcel of real property located at **5528 Doane Avenue, Portland Oregon**, also described as ConocoPhillips Company's Portland Terminal, and further identified by the **Multnomah** County Assessor as Parcel No. **1N1-E19-100** and (the "Property");

**WHEREAS**, Licensee now desires to enter the Property of Licensor for the purpose of repairing the 60 inch storm water sewer pipe, connecting Manhole "MH-77" to Outfall "22", inside the boundaries of the Property, as well as groundwater sampling and remediation activities, including, but not limited to the following activities, located and labeled as indicated on **Exhibit "A"**, attached hereto and incorporated herein (the "Work"):

- Installation of steel plates over non-reinforced underground pipelines in the sandlot area to protect the pipelines from heavy vehicular traffic;
- Installation of a gravel roadway in the sandlot area to accommodate heavy vehicular traffic;
- Installation of a cofferdam and pumping equipment to remove water from the 60" storm sewer pipe and prevent further accumulation of water from Outfall "22";
- Placement of a Baker tank for temporary storage of groundwater removed from the 60" pipe;
- Removal of protruding bolts from the inner surface of the 60" pipe;
- Video recording of the inside of the 60" pipe;
- Removal of the chain link fence along the southern perimeter of the sandlot and replacement with a US Coast Guard approved temporary fence;
- Saw cutting and removal of the top of the concrete vault located beneath Manhole "MH-77";
- Replacement and repair of the vault top to conform with the diameter required for liner installation;
- Installation of a water diversion system to prevent water from entering Manhole "MH-77" from the terminal side of the pipe;
- Installation of the epoxy cure in place pipe liner from Manhole "MH-77" to Outfall "22";
- Demobilization of all pipe lining equipment;
- Removal of all temporary water diversion/collection devices;
- Removal of the temporary fence and replacement of the permanent fence along the southern perimeter of the sandlot;
- Groundwater sampling and cutoff wall maintenance; sheen monitoring and sheen cleanup at Outfall "22";
- Remediation for cutoff walls to include operations and maintenance of equipment on the Property, in-well equipment, and storage of remediation materials in the Terminal Asphalt shed.

**WHEREAS**, A Gantt chart, listing the proposed schedule for the Work, as of the date of the Agreement, is provided as **Exhibit "B"**, attached hereto and incorporated herein by reference. Said proposed schedule and the above activities list are subject to change based on site conditions and other contingencies; and

**WHEREAS**, the Parties now desire to enter into this Agreement to provide for the requested access for the purposes of the Work and to ensure that the Property and Licensor's interests are adequately protected;

**NOW THEREFORE**, in consideration of the granting of the foregoing, the mutual premises, covenants, conditions and agreements hereinafter set forth, and other good and valuable consideration, the receipt and adequacy of which are acknowledged, the Parties agree as follows:

1. Incorporation by Reference. The above recitals are hereby incorporated by reference into this Agreement.

2. Right of Entry. Licensee and its employees, agents, consultants, contractors, or other authorized representatives shall, as necessary, have the limited privilege to enter the Property subject to the specific conditions of this Agreement, for the purpose of the Work.

3. Term. This License shall commence on **July 6, 2009** (Effective Date) and shall continue until the earlier of **March 31, 2022**, or completion of the Work, unless further extended by written agreement between the Parties. Notwithstanding the foregoing, Licensor, in its discretion, shall have the right to terminate this Agreement upon at least thirty (30) days prior written notice to Licensee. Licensor acknowledges that in the event this License is terminated, Licensee may require additional time beyond thirty days to obtain necessary approvals from regulatory agencies in order to remove equipment installed pursuant to this License, if any.

4. Prior Notice of Access; Coordination. Licensee shall notify Licensor's personnel identified in Section 10 herein (Notices) in advance of any field mobilization of the Work. In addition, Licensee shall notify Licensor verbally, at least 72 hours prior to the entering onto the Property for the purposes of the Work, either in person or by telephone contact to Licensor's personnel identified in Paragraph 12 herein (Notices). Licensor further agrees to coordinate the Work with Licensor to minimize any inconvenience to or interruption of the conduct of Licensor's operations on the Property.

5. Compliance with Laws. Licensee shall comply with all Applicable Laws in undertaking the activities authorized by the Agreement. Applicable Laws shall mean any and all: (a) federal, state and local laws, statutes, rulings, rules, promulgations, directives, regulations, ordinances, consent and other orders, guidances from regulatory agencies, and interpretations, judicial decisions, decrees, common law, injunctions, writs, codes, standards, permits, certificates and licenses of any governmental authority in effect on the date hereof (and as hereafter amended from time to time) or hereafter enacted or imposed, in any way applicable to Licensee, or the Property.

6. Property Restoration. Licensee will make every effort to minimize disturbance of the Property. Licensee shall promptly restore the Property, to the extent practicable, to its condition prior to the Work authorized under the Agreement. Such restoration activities will include, but are not limited to, prompt removal of all contained investigation-derived waste, as required by the Licensee and removal of any and all equipment. This obligation shall survive the termination of this Agreement, howsoever brought about, and shall be effective regardless of when claims or liabilities are made or asserted.

7. Permits and Reporting Obligations. Licensee shall obtain all necessary permits and authorizations from all appropriate governmental agencies to conduct the Work authorized herein,

and shall make all required notifications and fulfill all reporting obligations required by applicable laws.

8. Indemnity. Licensee agrees that it will indemnify and hold Licensor harmless from and against any and all claims, demands, actions, suits, judgments, losses, damages, costs, or expenses (including reasonable attorneys fees and expenses) incurred as a result of personal injury, property damage, civil penalties, or fines proximately caused by the Licensee's or its contractor's entry onto the property. However, this indemnity and hold harmless obligation shall not apply to any such claims, demands, actions, suits, judgments, losses, damages, costs, or expenses (1) to the extent caused by the sole negligence, gross negligence, or willful misconduct of Licensor or (2) to the extent arising out of or caused by activities conducted by Licensee on behalf of Licensor. This indemnity is expressly conditioned on the following:

(a) In the event Licensor shall identify any matter to which this indemnity may apply or receive a notice or claim from any third party of such matter, it shall immediately, and in every case within thirty (30) days of said notice or claim, notify Licensee in writing of such matter.

(b) Licensor shall cooperate with Licensee by allowing Licensee, its agents, representatives, contractors and consultants, prompt and ready access to the Property for the purpose of investigating any matter to which this indemnity may apply. Licensor shall provide Licensee with copies of all investigative reports, data or other information in any form which Licensor, its consultants, agents or attorneys may have pertaining to any such matter, on request of Licensee.

(c) Notwithstanding anything in this agreement to the contrary, in no event shall either party be liable to the other party for any special, indirect, or consequential damages including, but not limited to, claims for loss of use, rents, anticipated profit or business opportunity, or business interruption.

9. Insurance Requirements - Licensee agrees to maintain insurance of the types and with limits of liability not less than those set out below at its expense during the term of this Agreement from insurers reasonably acceptable to Licensor covering items, risks and operations required to fulfill the Agreement:

(a) Insurance that Licensee is obliged by law to carry that covers all of Licensee's employees performing work under this Agreement including, without limitation, coverage under applicable maritime law. Such insurance shall protect Licensor as an alternate employer against claims asserted against Licensor by Licensee's workers as "borrowed servants", statutory employees, or maritime employees.

(b) Employer's Liability Insurance, including coverage for marine operations if applicable, with a limit of \$1,000,000 USD (or the equivalent in local currency) any one occurrence or the statutory requirement, whichever is greater. Such insurance shall protect Licensor as an alternate employer against claims asserted against Licensor by Licensee's workers as "borrowed servants", statutory employees, or maritime employees.

(c) Commercial or Comprehensive General Liability Insurance, including contractual liability coverage, with a limit of \$1,000,000 USD (or the equivalent in local

currency) any one occurrence. Such insurance shall include sudden and accidental pollution liability coverage.

(d) Automobile Liability Insurance with a combined bodily injury and property damage limit of \$1,000,000 USD (or the equivalent in local currency) any one occurrence or the statutory requirement, whichever is greater, for all owned and leased vehicles.

(e) Such other insurance in the types and amounts required by applicable law.

All insurance required above shall be primary to any insurance coverage available to Licensor and each of its Affiliates and Co-ventures. The above-stated minimum requirements are not intended to indicate the amounts and types of insurance that Licensee need or may ultimately need.

The policies under Paragraphs 9 (c) and (d) above shall be endorsed to show Licensor and each of its Affiliates and Co-Venturers as additional insureds and all insurance policies obtained by Licensee shall contain a waiver of subrogation in favor of Licensor to the extent of the liabilities assumed by Licensee under this Agreement. Licensor, likewise, shall ensure that any insurance policies relevant to this Agreement shall contain a waiver of subrogation in favor of Licensee to the extent of the liabilities assumed by Licensor under this Agreement. The policies provided for under this paragraph shall contain a provision that any breach by Licensee of any warranty, covenant, or representation in any of the policies shall not prejudice any claim by the additional insured.

Upon Licensor's request, Licensee shall furnish to Licensor certificates of insurance demonstrating that Licensee has obtained the insurance coverage set out above and containing a statement that the said insurance will not be materially changed or cancelled without at least thirty (30) days prior written notice to Licensor. All coverages must be written on forms reasonably acceptable to Licensor. Neither review nor failure to review such certificates shall constitute approval thereto or be deemed to waive or diminish Licensor's rights under this Agreement. In the event of an accident or loss resulting in an insurance claim, Licensee, at Licensor's request, shall provide Licensor with certified copies of its insurance policies for which Licensor is shown as an additional insured. This obligation shall survive the termination of the Agreement.

Neither failure to comply, nor full compliance with the insurance provisions of this Agreement shall limit or relieve Licensee from its liability and/or indemnity obligations in this Agreement. If Licensee fails or refuses to comply with the obligations prescribed in Paragraph 9 herein, Licensor, without prejudice to any other rights or remedies available to it under the Agreement or at law, may (i) treat the Agreement as having been repudiated by Licensee or (ii) procure the required insurances and deduct the cost thereof from any amounts due hereunder or otherwise recover such amounts from Licensee.

Notwithstanding the above, Licensor acknowledges that its insurance requirements as to Licensee are satisfied by Licensee's maintaining a self-administered claims program with respect to its duties hereunder. Licensee shall require contractors who perform the Work under this Agreement to maintain liability insurance coverage in accordance with the service agreements between Licensee and its contractors.

10. Notices. Except as otherwise specially provided herein, all notices required or made under this Agreement shall be in writing and shall be made as follows:

**To Licensor:**                   **ConocoPhillips Company**  
   **Property Tax, Real Estate, Right of Way & Claims**  
   **1232 Park Street, Suite 300**

Paso Robles, CA 93446  
Attn: Colleen S. Hagemann  
Phone: (805) 226-2649  
Facsimile: (805) 239-4410

With Copies to: ConocoPhillips Company  
Risk Management & Remediation  
1230 West Washington Street  
Suite 212  
Tempe, AZ 85281  
Attn: Myron W. Smith  
Phone: (602) 452-2505  
Facsimile: (602) 452-2509

ConocoPhillips Company  
5528 Doane Avenue  
Portland, OR 97210  
Attn: Tom Lyons  
Phone: (503) 248-1572  
Facsimile: (503) 248-1540

To Licensee: Chevron U.S.A. Inc.  
6111 Bollinger Canyon Road  
San Ramon, CA 94583  
Attn: Brett Hunter  
Phone: 925-543-2371  
Facsimile: 925-543-2324

With Copies to: Chevron U.S.A. Inc.  
6111 Bollinger Canyon Road  
San Ramon, CA 94583  
Attn: Kelly Esters  
Phone: 925-543-2376  
Facsimile: 925-543-2324

Either party may change the above designations by written notice to the other party.

11. Parties Bound. This Agreement and the rights and obligations created hereby shall be binding upon and inure to the benefit of the Parties hereto, their heirs, assigns or successors in interest. Neither party may assign the rights and obligations provided for herein without the prior written consent of the other party.

12. Severability. The invalidity or unenforceability of any provision hereof shall not affect the validity or enforceability of any other provision.

13. Modification. This Agreement shall not be modified by oral agreements. All modifications to the Agreement must be in one writing, executed by both Parties.

14. Waiver. Failure to insist upon strict compliance with any provision hereof shall not be deemed a waiver of such provision or any other provision hereof. The waiver by any party of any

breach of any of the provisions of this Agreement shall not constitute a continuing waiver or a waiver of any subsequent breach of the same, or of any other provision of this Agreement.

15. Governing Law. This Agreement shall be construed and interpreted and governed by and in accordance with the local law of the State of **Oregon** without reference to any choice of law, rules or policies which may refer the resolution of any dispute arising hereunder to the laws of any other jurisdiction.

16. Safety. While on the Property, Licensee, its employees, agents, consultants, contractors, or other authorized representatives shall strictly abide by Licensor's Health and Safety Procedures, be OSHA Hazwoper trained, and meet Licensor's required coverage of insurance, as set forth herein.

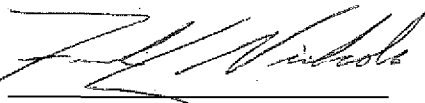
17. Utility Clearance. All utility clearance for the activities conducted on the Property shall be performed by Licensee.

18. Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, and all of which, taken together, shall constitute one and the same Agreement.

IN WITNESS WHEREOF, the Parties have executed this Agreement by their duly authorized representative(s).

**LICENSOR**

**CONOCOPHILLIPS COMPANY**

By: 

Name: Frank L. Nichols

Title: Advisor

Date: 06 JUL 2009

**LICENSEE**

**CHEVRON U.S.A., INC.**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

breach of any of the provisions of this Agreement shall not constitute a continuing waiver or a waiver of any subsequent breach of the same, or of any other provision of this Agreement.

15. Governing Law. This Agreement shall be construed and interpreted and governed by and in accordance with the local law of the State of **Oregon** without reference to any choice of law, rules or policies which may refer the resolution of any dispute arising hereunder to the laws of any other jurisdiction.

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18. Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, and all of which, taken together, shall constitute one and the same Agreement.

**IN WITNESS WHEREOF**, the Parties have executed this Agreement by their duly authorized representative(s).

**LICENSOR**

**CONOCOPHILLIPS COMPANY**

By: 

Name: Frank L. Nichols

Title: Advisor

Date: 06 JUL 2009

**LICENSEE**

**CHEVRON U.S.A., INC.**

By: 

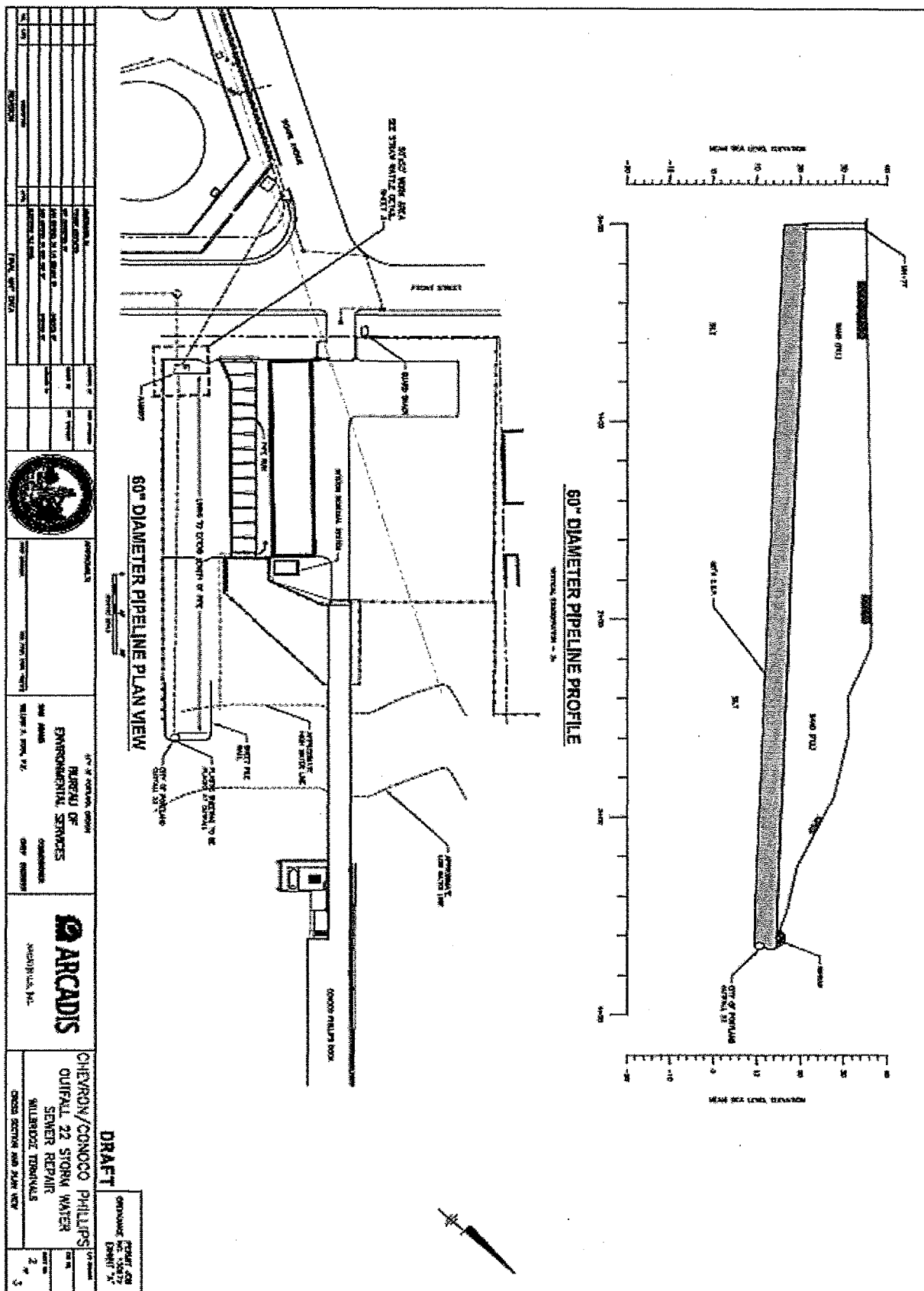
Name: Hongyan Xun

Title: Assistant Secretary

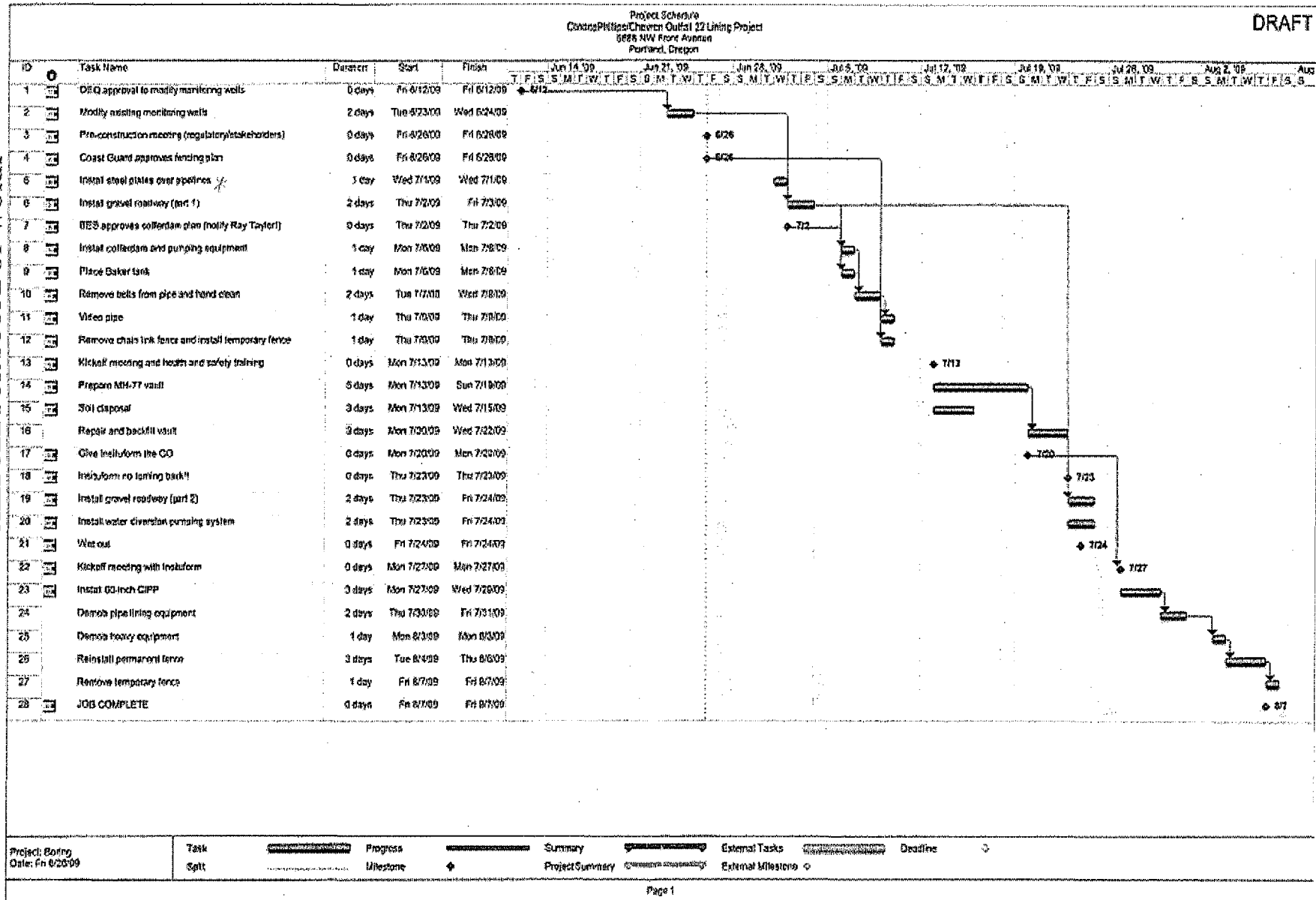
Date: 7/6/09



**EXHIBIT A: SITE MAP**  
**LOCATIONS AFFECTED BY SCOPE OF WORK**



# ATTACHMENT B – GANTT CHART PROPOSED SCHEDULE FOR SCOPE OF WORK



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**From:** Calhoun, Heather (US)  
**Sent:** Thursday, February 10, 2011 06:10 PM  
**To:** Mozart, Angie (PTS Staffing Solutions)  
**Subject:** FW: Red-Line: Stantec Consulting Corp. (Tracking #10-41650)  
**Attachments:** Agreement - Stantec Consulting Corp. 10-41597 (Redline to Angie Mozart 02-10-11).doc

Correction - see below.

Heather Calhoun  
tel +1 817-230-2600 direct +1 817-230-2633  
Please visit the BNSF Permits website for more information:  
<<http://www.bnsf.com/communities/faqs/permits-real-estate/>>  
<http://www.bnsf.com/communities/faqs/permits-real-estate/>

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From: Calhoun, Heather (US)  
Sent: Thursday, February 10, 2011 12:05 PM  
To: 'Mozart, Angie (PTS Staffing Solutions)'  
Subject: Red-Line: Stantec Consulting Corp. (Tracking #10-41650)

Angie:

Per your request, attached is a copy of the agreement for red-lining purposes. Once you have finished, please e-mail the document back to me and I will forward it on to the appropriate person(s) within BNSF.

There will be a \$600 revision fee for the name change. I will have to send it back to the engineering firm to have it corrected.

I apologize for the delay but our office was closed four days last week as well as yesterday due to inclement weather.

Please contact me if you have any questions.

Thanks!

Heather Calhoun  
tel +1 817-230-2600 direct +1 817-230-2633  
Please visit the BNSF Permits website for more information:  
<<http://www.bnsf.com/communities/faqs/permits-real-estate/>>  
<http://www.bnsf.com/communities/faqs/permits-real-estate/>

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From: Mozart, Angie (PTS Staffing Solutions) [mailto:Angie.Mozart@contractor.conocophillips.com]  
Sent: Thursday, February 10, 2011 11:05 AM  
To: Calhoun, Heather (US)  
Subject: RE: Pending Environmental Access Permit: ConocoPhillips Company and Stantec Consulting Corp. (Tracking #10-41650)

Heather,

**COP0020221**

As we discussed on the phone on 1/28/11, I was hoping you might be able to send me the updated agreement in ConocoPhillips' name in Word format, with the specifics of the additional name change fee.

Regards,

Angie Mozart

Contracts Associate

Phone: (805) 226-2653

angie.mozart@contractor.conocophillips.com

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From: Mozart, Angie (PTS Staffing Solutions)  
Sent: Monday, January 24, 2011 11:26 AM  
To: 'Calhoun, Heather (US)'  
Subject: RE: Pending Environmental Access Permit: ConocoPhillips Company and Stantec Consulting Corp. (Tracking #10-41650)

Heather,

I apologize for our confusion. I was forwarded the License for Environmental Access (Tracking #10-41597) last week to process for the correct ConocoPhillips internal approvals and signature. Since ConocoPhillips is the responsible party, and Stantec is our contractor, the agreement will need to be between BNSF and ConocoPhillips. Would it be possible to please get a new version updated to ConocoPhillips?

Also, I will need to have ConocoPhillips Legal and Corporate Insurance departments review and approve the agreement. Would it be possible to get that in Word version?

So that you know, ConocoPhillips recently processed an agreement with BNSF which was finalized August of 2010 with Julie Alexander, Tracking #10-40781 (in case it's helpful to review that file). I will remind our Corporate Insurance of the review process for that agreement as well, to hopefully help our approval process.

Should I contact Aimee Austin directly to get written consent from BNSF to allow ConocoPhillips to self-insure?

Regards,

Angie Mozart

Contracts Associate

Principal Technical Services - Approved service provider of

ConocoPhillips Company, Corporate Real Estate -

Property Tax, Real Estate, Right of Way & Claims (PTRRC)

1232 Park Street, Suite 300

**COP0020222**

Paso Robles, CA 93446

Phone: (805) 226-2653

angie.mozart@contractor.conocophillips.com

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The information contained in this message may be CONFIDENTIAL and is intended for the addressee only. Any unauthorized use, dissemination of the information or copying of this message is prohibited. If you are not the addressee, please notify the sender immediately by return e-mail and delete this message. Thank You.

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From: Calhoun, Heather (US) [mailto:Heather.Calhoun@am.jll.com]  
Sent: Friday, December 03, 2010 7:20 AM  
To: mark.trewartha@stantec.com  
Cc: Mozart, Angie (PTS Staffing Solutions)  
Subject: RE: Pending Environmental Access Permit: ConocoPhillips Company and Stantec Consulting Corp. (Tracking #10-41650)  
Importance: High

Mark:

One more thing - I also have a pending Environmental Access application for ConocoPhillips Company and Stantec Consulting Corp. (Tracking #10-41597). This was received on 10/18/10 and appears to be at the same exact location as the application referenced below (Tracking #10-41650). You and I spoke back in October regarding both names being listed on that application, and you were going to submit a revised copy. Please confirm if you all need two permits or if these are duplicates. I will cancel one of them if that is the case.

Let me know as soon as possible.

Thanks!

Heather Calhoun  
tel +1 817-230-2600 direct +1 817-230-2633  
Please visit the BNSF Permits website for more information:  
<<http://www.bnsf.com/communities/faqs/permits-real-estate/>>  
<http://www.bnsf.com/communities/faqs/permits-real-estate/>

-----  
From: Calhoun, Heather (US)  
Sent: Friday, December 03, 2010 9:09 AM  
To: 'mark.trewartha@stantec.com'  
Cc: 'angie.mozart@contractor.conocophillips.com'  
Subject: Pending Environmental Access Permit: ConocoPhillips Company and Stantec Consulting Corp. (Tracking #10-41650)  
Importance: High

Mark:

This e-mail is regarding the Environmental Access application submitted to conduct soil sampling and manhole monitoring in Portland, Multnomah County, Oregon. I received a voicemail from Nicole at AECOM requesting a status of this permit. I am currently waiting on an approval from BNSF Operating. That request was sent on 11/16/10 and I sent a follow-up this morning. Please be

**COP0020223**

advised that I need one point of contact for this permit and you are the person listed on the application. If you could update everyone involved on this project I would appreciate it.

Also, there are two names listed on the application but we can only have one Licensee. Please advise whether this permit will be under the name of ConocoPhillips Company or Stantec Consulting Corp. I am assuming it will be under Stantec's name since they are the contractor and will be doing the work, but I am asking that you confirm.

Please advise at your next earliest convenience and contact me with any questions.

Thanks!

Jones Lang LaSalle - Proud Real Estate Partner of BNSF

Heather Calhoun  
Senior Contract Specialist - Fort Worth  
Jones Lang LaSalle Americas, Inc.  
3017 Lou Menk Dr., Suite 100  
Fort Worth, Texas 76131-2800  
tel +1 817-230-2600 direct +1 817-230-2633  
fax +1 817-306-8265  
heather.calhoun@am.jll.com

[www.joneslanglasalle.com](http://www.joneslanglasalle.com)  
Please visit the BNSF Permits website for more information:  
<http://www.bnsf.com/communities/faqs/permits-real-estate/>

This email is for the use of the intended recipient(s) only. If you have received this email in error, please notify the sender immediately and then delete it. If you are not the intended recipient, you must not keep, use, disclose, copy or distribute this email without the author's prior permission. We have taken precautions to minimize the risk of transmitting software viruses, but we advise you to carry out your own virus checks on any attachment to this message. We cannot accept liability for any loss or damage caused by software viruses. The information contained in this communication may be confidential and may be subject to the attorney-client privilege. If you are the intended recipient and you do not wish to receive similar electronic messages from us in the future then please respond to the sender to this effect.

**COP0020224**

**LICENSE FOR ENVIRONMENTAL ACCESS**

**THIS LICENSE** ("License"), made as of the \_\_\_\_ day of \_\_\_\_\_, 2011 ("Effective Date") by and between **BNSF RAILWAY COMPANY**, a Delaware corporation ("Licensor") and **STANTEC CONSULTING CORP.**, a Delaware corporation ("Licensee").

**NOW THEREFORE**, in consideration of the mutual covenants contained herein, the parties agree to the following:

**GENERAL**

1. Licensor hereby grants Licensee a non-exclusive license, subject to all rights, interests, and estates of third parties, including, without limitation, any leases, licenses, easements, liens or other encumbrances, and upon the terms and conditions set forth below, to use the area of Licensor's property shown on the attached Drawing No. 1-50309, dated October 20, 2010 and revised December 3, 2010, attached hereto, marked Exhibit "A", and made a part hereof, situated at or near Portland, County of Multnomah, State of Oregon, Line Segment 0047, Mile Post 3.86 ("Premises") for the purposes specified in Section 3 below.
2. Licensee shall not disturb any improvements of Licensor or Licensor's existing lessees, licensees, easement beneficiaries or lien holders, if any, or interfere with the use of such improvements.
3. Licensee shall use Premises exclusively as a site for performing environmental and engineering explorations to include one of, or a combination of, the following categories of work:
  - (a) Drilling of soil test borings;
  - (b) Installation of groundwater monitoring wells;
  - (c) Performing groundwater inflow tests on wells;
  - (d) Obtaining groundwater samples from wells;
  - (e) Maintenance and/or checking groundwater level in wells approximately one time per month;
  - (f) Performance of any necessary remediation as determined by Licensor in its sole discretion or by applicable state and/ or federal regulations at Licensee's sole cost and expense. In the event applicable state and/or federal regulations require that the Premises be remediated, Licensee will obtain a No Further Action Letter, Release, or other such equivalent closure document from the state or federal agency having jurisdiction over the remediation of the Premises. Such No Further Action Letter, Release, or other such equivalent closure document shall not be contingent upon or specify the performance of any further work or conditions with respect to the Premises. Licensee warrants that it will conduct quarterly storm water sampling and monitor a manhole to test for petroleum related constituents. Licensee shall not use the Premises for any other purpose whatsoever. Licensee shall not use or store hazardous substances, as defined by the Comprehensive Environmental Response, Compensation, and Liability Act, as amended ("CERCLA") or petroleum or oil as defined by applicable Environmental Laws on the Premises.

4. In case of the eviction of Licensee by anyone owning or claiming title to or any interest in the Premises, Licensors shall not be liable to refund Licensee any compensation paid hereunder or for any damage Licensee sustains in connection therewith.
5. Any contractors or subcontractors performing work on the Premises, or entering the Premises on behalf of Licensee, shall be deemed agents of Licensee for purposes of this License.

#### **TERM**

6. This License shall commence on the Effective Date and shall continue for a period of two (2) years, subject to prior termination as hereinafter described.

#### **COMPENSATION**

7. (a) The fee for this License has been waived.
- (b) Licensee agrees to reimburse Licensors (within thirty (30) days after receipt of bills therefor) for all costs and expenses incurred by Licensors in connection with Licensee's use of the Premises, including but not limited to the furnishing of Licensors' Flagman and any vehicle rental costs incurred. The cost of flagger services provided by the Railway, when deemed necessary by the Railway's representative, will be borne by the Licensee. The estimated cost for one (1) flagger is \$800.00 for an eight (8) hour basic day with time and one-half or double time for overtime, rest days and holidays. The estimated cost for each flagger includes vacation allowance, paid holidays, Railway and unemployment insurance, public liability and property damage insurance, health and welfare benefits, transportation, meals, lodging and supervision. Negotiations for Railway labor or collective bargaining agreements and rate changes authorized by appropriate Federal authorities may increase actual or estimated flagging rates. The flagging rate in effect at the time of performance by the Contractor hereunder will be used to calculate the actual costs of flagging pursuant to this paragraph.
- (c) All invoices are due thirty (30) days after the date of invoice. In the event that Licensee shall fail to pay any monies due to Licensors within thirty (30) days after the invoice date, then Licensee shall pay interest on such unpaid sum from thirty (30) days after its invoice date to the date of payment by Licensee at an annual rate equal to (i) the greater of (a) for the period January 1 through June 30, the prime rate last published in *The Wall Street Journal* in the preceding December plus two and one-half percent (2 1/2%), and for the period July 1 through December 31, the prime rate last published in *The Wall Street Journal* in the preceding June plus two and one-half percent (2 1/2%), or (b) twelve percent (12%), or (ii) the maximum rate permitted by law, whichever is less.



**COMPLIANCE WITH LAWS**

8. (a) Licensee shall observe and comply with any and all laws, statutes, regulations, ordinances, orders, covenants, restrictions, or decisions of any court of competent jurisdiction ("Legal Requirements") relating to the use of the Premises.
- (b) Prior to entering the Premises, Licensee shall and shall cause its contractor to comply with all Licensor's applicable safety rules and regulations. Prior to commencing any work on the Premises, Licensee shall complete and shall require its contractor to complete the safety-training program at the following Internet Website "<http://contractororientation.com>". This training must be completed no more than one year in advance of Licensee's entry on the Premises.

**DEFINITION OF COST AND EXPENSE**

9. For the purpose of this License, "cost" or "costs" "expense" or "expenses" includes, but is not limited to, actual labor and material costs including all assignable additives, and material and supply costs at current value where used.

**RIGHT OF LICENSOR TO USE**

10. Licensor excepts and reserves the right, to be exercised by Licensor and any other parties who may obtain written permission or authority from Licensor:
  - (a) to maintain, renew, use, operate, change, modify and relocate any existing pipe, power, communication lines and appurtenances and other facilities or structures of like character upon, over, under or across the Premises;
  - (b) to construct, maintain, renew, use, operate, change, modify and relocate any tracks or additional facilities or structures upon, over, under or across the Premises; or
  - (c) to use the Premises in any manner as the Licensor in its sole discretion deems appropriate, provided Licensor uses all commercially reasonable efforts to avoid material interference with the use of the Premises by Licensee for the purpose specified in Section 3 above.

**LICENSEE'S OPERATIONS**

11. (a) Licensee shall notify Licensor's Roadmaster at 1515 W. 39<sup>th</sup> St., Vancouver, Washington 98660, telephone (360) 418-6324 or cell (360) 772-3353, and Licensor's Remediation Manager at 2454 Occidental Ave., 1A, Seattle, Washington 98134, telephone (206) 625-6376, at least ten (10) business days prior to entering the Premises. After completion of use of the Premises for the

purpose specified in Section 3, Licensee shall notify Licensor in writing that such use has been completed.

- (b) In performing the work described in Section 3, Licensee shall use only public roadways to cross from one side of Licensor's tracks to the other.
  - (c) Prior to the commencement of any work, Licensee shall submit a workplan to Licensor's Remediation Manager at 2454 Occidental Ave., 1A, Seattle, Washington 98134, telephone (206) 625-6376, for Licensor's review. No work, as set forth in Section 3, may be conducted by Licensee without Licensor's written consent of said workplan for the purpose specified in Section 3. Such review and consent by Licensor shall not constitute the sufficiency or effectiveness of any workplan.
  - (d) No monitoring wells may be installed on the property prior to written approval of Licensee's workplan for the installation of such monitoring wells. Upon obtaining such consent, Licensee shall provide Licensor the location of said well(s) relative to Licensor's nearest trackage, identifying Licensor's nearest Mile Post sign number.
12. Under no conditions shall Licensee be permitted to conduct any tests, investigations or any other activity using mechanized equipment and/or machinery, or place or store any mechanized equipment, tools or other materials, within twenty-five (25) feet of the centerline of any railroad track on the Premises unless Licensee has obtained prior written approval from Licensor. Licensee shall, at its sole cost and expense, perform all activities on and about the Premises in such a manner as not at any time to be a source of danger to or interference with the existence or use of present or future tracks, roadbed or property of Licensor, or the safe operation and activities of Licensor. If ordered to cease using the Premises at any time by Licensor's personnel due to any hazardous condition, Licensee shall immediately do so. Notwithstanding the foregoing right of Licensor, the parties agree that Licensor has no duty or obligation to monitor Licensee's use of the Premises to determine the safe nature thereof, it being solely Licensee's responsibility to ensure that Licensee's use of the Premises is safe. Neither the exercise nor the failure by Licensor to exercise any rights granted in this Section will alter the liability allocation provided by this License.
13. (a) Licensee shall explore the proposed location for such work with hand tools to a depth of at least three (3) feet below the surface of the ground to determine whether pipelines or other structures exist below the surface, provided, however, that in lieu of the foregoing, the Licensee shall have the right to use suitable detection equipment or other generally accepted industry practice (e.g., consulting with the Underground Services Association) to determine the existence or location of pipelines and other subsurface structures prior to drilling or excavating with mechanized equipment. Upon Licensee's written request, which shall be made thirty (30) business days in advance of Licensee's requested entry on the Premises, Licensor will provide Licensee any information that Licensor's Engineering Department has in its possession concerning the existence and approximate location of Licensor's underground utilities and pipelines on the Premises. Prior to conducting any such boring work, the Licensee will review all such material. Licensor does not warrant the

accuracy or completeness of information relating to subsurface conditions and Licensee's operations will be subject at all times to the liability provisions herein.

- (b) For all bores greater than 26-inch diameter and at a depth less than 10.0 feet below bottom of rail, a soil investigation will need to be performed by the Licensee and reviewed by Licensor prior to construction. This study is to determine if granular material is present, and to prevent subsidence during the installation process. If the investigation determines in Licensor's reasonable opinion that granular material is present, Licensor may select a new location for Licensee's use, or may require Licensee to furnish for Licensor's review and approval, in its sole discretion a remedial plan to deal with the granular material. Once Licensor has approved any such remedial plan in writing, Licensee shall, at its sole cost and expense, carry out the approved plan in accordance with all terms thereof and hereof.
- 14. Any open hole, boring or well constructed upon Premises by Licensee shall be safely covered and secured at all times when Licensee is not working in the actual vicinity thereof. Following completion of that portion of the work, all holes or borings constructed on the Premises by Licensee shall be:
  - (a) filled in to surrounding ground level with compacted bentonite grout; or
  - (b) otherwise secured or retired in accordance with any applicable Legal Requirement. No excavated materials may remain on the Premises for more than ten (10) days, but must be properly disposed of by Licensee in accordance with applicable Legal Requirements.
- 15. Upon completion of Licensee's work on the Premises or upon termination of this License, whichever shall occur first, Licensee shall, at its sole cost and expense:
  - (a) remove all of its equipment from the Premises;
  - (b) report and restore any damage to the Premises arising from, growing out of, or connected with Licensee's use of the Premises;
  - (c) remedy any unsafe conditions on the Premises created or aggravated by Licensee; and
  - (d) perform any other work to restore the Premises to a useable condition as deemed necessary in Licensor's sole discretion.
- 16. Licensee's on-site supervision shall retain/maintain a fully-executed copy of this License at all times while on the Premises.

#### **LIABILITY**

- 17. (a) **TO THE FULLEST EXTENT PERMITTED BY LAW, LICENSEE SHALL RELEASE, INDEMNIFY, DEFEND AND HOLD HARMLESS LICENSOR AND LICENSOR'S AFFILIATED COMPANIES, PARTNERS, SUCCESSORS,**

ASSIGNS, LEGAL REPRESENTATIVES, OFFICERS, DIRECTORS, SHAREHOLDERS, EMPLOYEES AND AGENTS (COLLECTIVELY, "INDEMNITEES") FOR, FROM AND AGAINST ANY AND ALL CLAIMS, LIABILITIES, FINES, PENALTIES, COSTS, DAMAGES, LOSSES, LIENS, CAUSES OF ACTION, SUITS, DEMANDS, JUDGMENTS AND EXPENSES (INCLUDING, WITHOUT LIMITATION, COURT COSTS, ATTORNEYS' FEES AND COSTS OF INVESTIGATION, REMOVAL AND REMEDIATION AND GOVERNMENTAL OVERSIGHT COSTS) ENVIRONMENTAL OR OTHERWISE (COLLECTIVELY "LIABILITIES") OF ANY NATURE, KIND OR DESCRIPTION OF ANY PERSON OR ENTITY DIRECTLY OR INDIRECTLY ARISING OUT OF, RESULTING FROM OR RELATED TO (IN WHOLE OR IN PART):

- (i) THIS LICENSE, INCLUDING, WITHOUT LIMITATION, ITS ENVIRONMENTAL PROVISIONS,
- (ii) ANY RIGHTS OR INTERESTS GRANTED PURSUANT TO THIS LICENSE,
- (iii) LICENSEE'S OCCUPATION AND USE OF THE PREMISES,
- (iv) THE ENVIRONMENTAL CONDITION AND STATUS OF THE PREMISES CAUSED BY OR CONTRIBUTED BY LICENSEE, OR
- (v) ANY ACT OR OMISSION OF LICENSEE OR LICENSEE'S OFFICERS, AGENTS, INVITEES, EMPLOYEES, OR CONTRACTORS, OR ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM, OR ANYONE THEY CONTROL OR EXERCISE CONTROL OVER,

EVEN IF SUCH LIABILITIES ARISE FROM OR ARE ATTRIBUTED TO, IN WHOLE OR IN PART, ANY NEGLIGENCE OF ANY INDEMNITEE. THE ONLY LIABILITIES WITH RESPECT TO WHICH LICENSEE'S OBLIGATION TO INDEMNIFY THE INDEMNITEES DOES NOT APPLY ARE LIABILITIES TO THE EXTENT PROXIMATELY CAUSED BY THE GROSS NEGLIGENCE OR WILLFUL MISCONDUCT OF AN INDEMNITEE.

- (b) FURTHER, TO THE FULLEST EXTENT PERMITTED BY LAW, NOTWITHSTANDING THE LIMITATION IN SECTION 17(a), LICENSEE SHALL NOW AND FOREVER WAIVE ANY AND ALL CLAIMS, REGARDLESS WHETHER BASED ON THE STRICT LIABILITY, NEGLIGENCE OR OTHERWISE, THAT RAILROAD IS AN "OWNER", "OPERATOR", "ARRANGER", OR "TRANSPORTER" WITH RESPECT TO THE PREMISES FOR THE PURPOSES OF CERCLA OR OTHER ENVIRONMENTAL LAWS. LICENSEE WILL INDEMNIFY, DEFEND AND HOLD THE INDEMNITEES HARMLESS FROM ANY AND ALL SUCH CLAIMS REGARDLESS OF THE NEGLIGENCE OF THE INDEMNITEES. LICENSEE FURTHER AGREES THAT THE USE OF THE PREMISES AS CONTEMPLATED BY THIS LICENSE SHALL NOT IN ANY WAY SUBJECT LICENSOR TO CLAIMS THAT

LICENSOR IS OTHER THAN A COMMON CARRIER FOR PURPOSES OF ENVIRONMENTAL LAWS AND EXPRESSLY AGREES TO INDEMNIFY, DEFEND, AND HOLD THE INDEMNITEES HARMLESS FOR ANY AND ALL SUCH CLAIMS. IN NO EVENT SHALL LICENSOR BE RESPONSIBLE FOR THE ENVIRONMENTAL CONDITION OF THE PREMISES.

- (c) TO THE FULLEST EXTENT PERMITTED BY LAW, LICENSEE FURTHER AGREES, REGARDLESS OF ANY NEGLIGENCE OR ALLEGED NEGLIGENCE OF ANY INDEMNITEE, TO INDEMNIFY, AND HOLD HARMLESS THE INDEMNITEES AGAINST AND ASSUME THE DEFENSE OF ANY LIABILITIES ASSERTED AGAINST OR SUFFERED BY ANY INDEMNITEE UNDER OR RELATED TO THE FEDERAL EMPLOYERS' LIABILITY ACT ("FELA") WHENEVER EMPLOYEES OF LICENSEE OR ANY OF ITS AGENTS, INVITEES, OR CONTRACTORS CLAIM OR ALLEGE THAT THEY ARE EMPLOYEES OF ANY INDEMNITEE OR OTHERWISE. THIS INDEMNITY SHALL ALSO EXTEND, ON THE SAME BASIS, TO FELA CLAIMS BASED ON ACTUAL OR ALLEGED VIOLATIONS OF ANY FEDERAL, STATE OR LOCAL LAWS OR REGULATIONS, INCLUDING BUT NOT LIMITED TO THE SAFETY APPLIANCE ACT, THE BOILER INSPECTION ACT, THE OCCUPATIONAL HEALTH AND SAFETY ACT, THE RESOURCE CONSERVATION AND RECOVERY ACT, AND ANY SIMILAR STATE OR FEDERAL STATUTE.
- (d) Upon written notice from Licensor, Licensee agrees to assume the defense of any lawsuit or other proceeding brought against any Indemnatee by any entity, relating to any matter covered by this License for which Licensee has an obligation to assume liability for and/or save and hold harmless any Indemnatee. Licensee shall pay all costs incident to such defense, including, but not limited to, attorneys' fees, investigators' fees, litigation and appeal expenses, settlement payments, and amounts paid in satisfaction of judgments.

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#### **PERSONAL PROPERTY WAIVER**

18. ALL PERSONAL PROPERTY, INCLUDING, BUT NOT LIMITED TO, FIXTURES, EQUIPMENT, OR RELATED MATERIALS UPON THE PREMISES WILL BE AT THE RISK OF LICENSEE ONLY, AND NO INDEMNITEE WILL BE LIABLE FOR ANY DAMAGE THERETO OR THEFT THEREOF, WHETHER OR NOT DUE IN WHOLE OR IN PART TO THE NEGLIGENCE OF ANY INDEMNITEE.

#### **INSURANCE**

19. Licensee shall, at its sole cost and expense, procure and maintain during the life of this Agreement the following insurance coverage:
- A. Commercial General Liability Insurance. This insurance shall contain broad form contractual liability with a combined single limit of a minimum of \$2,000,000 each occurrence and an aggregate limit of at least \$ 4,000,000.

Coverage must be purchased on a post 1998 ISO occurrence or equivalent and include coverage for, but not limited to, the following:

- ◆ Bodily Injury and Property Damage
- ◆ Personal Injury and Advertising Injury
- ◆ Fire legal liability
- ◆ Products and completed operations

This policy shall also contain the following endorsements, which shall be indicated on the certificate of insurance:

The employee and workers compensation related exclusions in the above policy shall not apply with respect to claims related to railroad employees.

- ◆ The definition of insured contract shall be amended to remove any exclusion or other limitation for any work being done within 50 feet of railroad property.
- ◆ Any exclusions related to the explosion, collapse and underground hazards shall be removed.

No other endorsements limiting coverage may be included on the policy.

- B. Business Automobile Insurance. This insurance shall contain a combined single limit of at least \$1,000,000 per occurrence, and include coverage for, but not limited to the following:
- ◆ Bodily injury and property damage
  - ◆ Any and all vehicles owned, used or hired
- C. Workers Compensation and Employers Liability Insurance. This insurance shall include coverage for, but not limited to:
- ◆ Licensee's statutory liability under the worker's compensation laws of the state(s) in which the work is to be performed. If optional under State law, the insurance must cover all employees anyway.
  - ◆ Employers' Liability (Part B) with limits of at least \$500,000 each accident, \$500,000 by disease policy limit, \$500,000 by disease each employee.
- D. Railroad Protective Liability Insurance. This insurance shall name only the Licensor as the Insured with coverage of at least \$2,000,000 per occurrence and \$6,000,000 in the aggregate. The coverage obtained under this policy shall only be effective during the initial environmental testing and/or exploration. If further exploration and testing is needed at a later date, an additional Railroad Protective Liability Insurance Policy shall be required. The policy shall be issued on a standard ISO form CG 00 35 10 93 and include the following:
- ◆ Endorsed to include the Pollution Exclusion Amendment (ISO form CG 28 31 10 93)
  - ◆ Endorsed to include the Limited Seepage and Pollution Endorsement.
  - ◆ Endorsed to include Evacuation Expense Coverage Endorsement.
  - ◆ No other endorsements restricting coverage may be added.
  - ◆ The original policy must be provided to the Licensor prior to performing any work or services under this Agreement

In lieu of providing a Railroad Protective Liability Policy, Licensee may participate in Licensors Blanket Railroad Protective Liability Insurance Policy available to Licensee or its contractor. The limits of coverage are the same as above. The cost is \$500.00.

- ☐ I **elect** to participate in Licensors Blanket Policy;
- ☐ I **elect not** to participate in Licensors Blanket Policy.

Other Requirements:

Where allowable by law all policies (applying to coverage listed above) shall contain no exclusion for punitive damages and certificates of insurance shall reflect that no exclusion exists.

Licensee agrees to waive its right of recovery against Licensors for all claims and suits against Licensors. In addition, its insurers, through policy endorsement, waive their right of subrogation against Licensors for all claims and suits. The certificate of insurance must reflect waiver of subrogation endorsement. Licensee further waives its right of recovery, and its insurers also waive their right of subrogation against Licensors for loss of its owned or leased property or property under its care, custody, or control.

Licensees insurance policies through policy endorsement must include wording which states that the policy shall be primary and non-contributing with respect to any insurance carried by Licensors. The certificate of insurance must reflect that the above wording is included in evidenced policies.

All policy(ies) required above (excluding Workers Compensation and if applicable, Railroad Protective) shall include a severability of interest endorsement and shall name Licensors and Staubach Global Services - RR, Inc. as an additional insured with respect to work performed under this agreement. Severability of interest and naming Licensors and Staubach Global Services - RR, Inc. as additional insureds shall be indicated on the certificate of insurance.

Licensee is not allowed to self-insure without the prior written consent of Licensors. If granted by Licensors, any deductible, self-insured retention or other financial responsibility for claims shall be covered directly by Licensee in lieu of insurance. Any and all Licensors liabilities that would otherwise, in accordance with the provisions of this Agreement, be covered by Licensees insurance will be covered as if Licensee elected not to include a deductible, self-insured retention, or other financial responsibility for claims.

Prior to commencing the Work, Licensee shall furnish to Licensors an acceptable certificate(s) of insurance including an original signature of the authorized representative evidencing the required coverage, endorsements, and amendments. The policy(ies) shall contain a provision that obligates the insurance company(ies) issuing such policy(ies) to notify Licensors in writing at least 30 days prior to any cancellation, non-renewal, substitution or material alteration. This cancellation

provision shall be indicated on the certificate of insurance. In the event of a claim or lawsuit involving Railroad arising out of this agreement, Licensee will make available any required policy covering such claim or lawsuit.

Any insurance policy shall be written by a reputable insurance company acceptable to Licensor or with a current Best's Guide Rating of A- and Class VII or better, and authorized to do business in the state(s) in which the service is to be provided.

Licensee represents that this License has been thoroughly reviewed by Licensee's insurance agent(s)/broker(s), who have been instructed by Licensee to procure the insurance coverage required by this Agreement. Allocated Loss Expense shall be in addition to all policy limits for coverages referenced above.

Not more frequently than once every five years, Licensor may reasonably modify the required insurance coverage to reflect then-current risk management practices in the railroad industry and underwriting practices in the insurance industry.

If any portion of the operation is to be subcontracted by Licensee, Licensee shall require that the subcontractor shall provide and maintain insurance coverages as set forth herein, naming Licensor as an additional insured, and shall require that the subcontractor shall release, defend and indemnify Licensor to the same extent and under the same terms and conditions as Licensee is required to release, defend and indemnify Licensor herein.

Failure to provide evidence as required by this section shall entitle, but not require, Licensor to terminate this License immediately. Acceptance of a certificate that does not comply with this section shall not operate as a waiver of Licensee's obligations hereunder.

The fact that insurance (including, without limitation, self-insurance) is obtained by Licensee shall not be deemed to release or diminish the liability of Licensee including, without limitation, liability under the indemnity provisions of this License. Damages recoverable by Licensor shall not be limited by the amount of the required insurance coverage.

For purposes of this section, Licensor shall mean "Burlington Northern Santa Fe Corporation", "BNSF Railway Company" and the subsidiaries, successors, assigns and affiliates of each.

#### **ENVIRONMENTAL**

20. (a) Licensee shall strictly comply with all federal, state and local environmental laws and regulations in its use of the Premises, including, but not limited to, the Resource Conservation and Recovery Act, as amended (RCRA), the Clean Water Act, the Oil Pollution Act, the Hazardous Materials Transportation Act, CERCLA (collectively referred to as the "Environmental Laws"). Licensee shall not maintain a treatment, storage, transfer or disposal facility, or underground



storage tank, as defined by Environmental Laws on the Premises. Licensee shall not release or suffer the release of oil or hazardous substances, as defined by Environmental Laws on or about the Premises.

- (b) Licensee shall give Licensor immediate notice to Licensor's Resource Operations Center at (800) 832-5452 of any release of hazardous substances on or from the Premises, violation of Environmental Laws, or inspection or inquiry by governmental authorities charged with enforcing Environmental Laws with respect to Licensee's use of the Premises. Licensee shall use the best efforts to promptly respond to any release on or from the Premises. Licensee also shall give Licensor immediate notice of all measures undertaken on behalf of Licensee to investigate, remediate, respond to or otherwise cure such release or violation.
- (c) Licensee recognizes and assumes all responsibility for all present and future environmental obligations imposed under applicable Environmental Laws, regulations or other such requirements relating to contamination of the Premises or groundwater thereunder arising from, caused by, contributed to, or in any way growing out of Licensee's operations. Licensee further agrees to undertake at its sole cost and expense any cleanup of any contamination of the Premises and groundwater thereunder arising from, caused by, contributed to, or in any way growing out of Licensee's operations as required by applicable laws and regulations.
- (d) Licensee agrees to waive any and all statutes of limitations applicable to any controversy or dispute arising out of Section 20(c), and Licensee further agrees that it will not raise or plead a statute of limitations defense against Licensor in any action arising out of Licensees' failure to comply with the preceding subsection.
- (e) In the event that Licensor has notice from Licensee or otherwise of a release or violation of Environmental Laws on the Premises which occurred or may occur during the term of this License, Licensor may require Licensee, at Licensee's sole risk and expense, to take timely measures to investigate, remediate, respond to or otherwise cure such release or violation affecting the Premises or Licensor's right-of-way.
- (f) Licensee shall promptly report to Licensor in writing any conditions or activities upon the Premises known to Licensee which create a risk of harm to persons, property or the environment and shall take whatever action is necessary to prevent injury to persons or property arising out of such conditions or activities; provided, however, that Licensee's reporting to Licensor shall not relieve Licensee of any obligation whatsoever imposed on it by this License. Licensee shall promptly respond to Licensor's request for information regarding said conditions or activities.
- (g) Licensee will promptly transmit to Licensor copies of all reports, data boring logs, well completion and other information obtained from all operations on the Premises to Licensor's Remediation Manager. Licensor shall have the option to

obtain split samples and otherwise have reasonable access to the groundwater monitoring well(s) subject to this License for the purpose of obtaining samples or other information from the monitoring well(s). Licensee shall also advise Licensors of any applicable health and safety plans or other similar programs in effect with respect to the operations on the Premises.

- (h) Unless otherwise required by applicable law, Licensee shall keep confidential and shall not disclose any reports, data boring logs, well completion and any other information obtained in connection with this License to third parties without the prior written consent of Licensors.

#### **ALTERATIONS**

21. Licensee may not make any alterations of the Premises or permanently affix anything to the Premises or any buildings or other structures adjacent to the Premises without Licensors' prior written consent.

#### **NO WARRANTIES**

22. LICENSOR'S DUTIES AND WARRANTIES ARE LIMITED TO THOSE EXPRESSLY STATED IN THIS LICENSE AND SHALL NOT INCLUDE ANY IMPLIED DUTIES OR IMPLIED WARRANTIES, NOW OR IN THE FUTURE. NO REPRESENTATIONS OR WARRANTIES HAVE BEEN MADE BY LICENSOR OTHER THAN THOSE CONTAINED IN THIS LICENSE. LICENSEE HEREBY WAIVES ANY AND ALL WARRANTIES WITH RESPECT TO THE PREMISES, EXPRESS OR IMPLIED, OR WHICH MAY EXIST BY OPERATION OF LAW OR IN EQUITY, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY, HABITABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

#### **QUIET ENJOYMENT**

23. LICENSOR DOES NOT WARRANT ITS TITLE TO THE PROPERTY NOR UNDERTAKE TO DEFEND LICENSEE IN THE PEACEABLE POSSESSION OR USE THEREOF. NO COVENANT OF QUIET ENJOYMENT IS MADE.

#### **DEFAULT**

24. If default shall be made in any of the covenants or agreements of Licensee contained in this document, or in case of any assignment or transfer of this License by operation of law, Licensors may, at its option, terminate this License by serving five (5) days' notice in writing upon Licensee. Any waiver by Licensors of any default or defaults shall not constitute a waiver of the right to terminate this License for any subsequent default or defaults, nor shall any such waiver in any way affect Licensors' ability to enforce any Section of this License. The remedy set forth in this Section 24 shall be in addition to, and not in limitation of, any other remedies that Licensors may have at law or in equity.

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#### **TERMINATION**

25. (a) This License may be terminated by Licensors, at any time, by serving ten (10) days' written notice of termination upon Licensee. This License may be terminated by Licensee upon execution of Licensors' Mutual Termination Letter Agreement then in effect. Upon expiration of the time specified in such notice, this License and all rights of Licensee shall absolutely cease.
- (b) Upon termination, should Licensee have installed its monitoring well(s) on the Premises, once Licensee's well(s) are retired, Licensee shall provide Licensors a copy of the closure documents, submitted directly to Licensors' Environmental Remediation Manager at 2454 Occidental Ave., 1A, Seattle, Washington 98134.
26. If Licensee fails to surrender to Licensors the Premises, upon any termination of this License, all liabilities and obligations of Licensee hereunder shall continue in effect until the Premises are surrendered. Termination shall not release Licensee from any liability or obligation, whether of indemnity or otherwise, resulting from any events happening prior to the date of termination.

#### **ASSIGNMENT**

27. Neither Licensee, nor the heirs, legal representatives, successors or assigns of Licensee, nor any subsequent assignee, shall assign or transfer this License or any interest herein, without the prior written consent and approval of Licensors, which may be withheld in Licensors' sole discretion.

#### **NOTICES**

28. Any notice required or permitted to be given hereunder by one party to the other shall be in writing and the same shall be given and shall be deemed to have been served and given if (i) placed in the United States mail, certified, return receipt requested, or (ii) deposited into the custody of a nationally recognized overnight delivery service, addressed to the party to be notified at the address for such party specified below, or to such other address as the party to be notified may designate by giving the other party no less than thirty (30) days' advance written notice of such change in address.

If to Licensors: Staubach Global Services - RR, Inc.  
3017 Lou Menk Drive, Suite 100  
Fort Worth, TX 76131  
Attn: Licenses/Permits

with a copy to: BNSF Railway Company  
2500 Lou Menk Dr. – AOB3  
Fort Worth, TX 76131  
Attn: Senior Manager Real Estate

with a copy to: BNSF Remediation Manager  
2454 Occidental Ave., 1A  
Seattle, WA 98134

If to Licensee:           Stantec Consulting Corp.  
                                  9400 S.W. Barnes Rd., Suite 200  
                                  Portland, OR 97225

### **SURVIVAL**

29.     Neither termination nor expiration will release either party from any liability or obligation under this License, whether of indemnity or otherwise, resulting from any acts, omissions or events happening prior to the date of termination or expiration, or, if later, the date when the Premises are restored to its condition as of the Effective Date.

### **RECORDATION**

30.     It is understood and agreed that this License shall not be placed on public record.

### **APPLICABLE LAW**

31.     All questions concerning the interpretation or application of provisions of this License shall be decided according to the substantive laws of the State of Texas without regard to conflicts of law provisions.

### **SEVERABILITY**

32.     To the maximum extent possible, each provision of this License shall be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this License shall be prohibited by, or held to be invalid under, applicable law, such provision shall be ineffective solely to the extent of such prohibition or invalidity, and this shall not invalidate the remainder of such provision or any other provision of this License.

### **INTEGRATION**

33.     This License is the full and complete agreement between Licensor and Licensee with respect to all matters relating to Licensee's use of the Premises, and supersedes any and all other agreements between the parties hereto relating to Licensee's use of the Premises as described herein. However, nothing herein is intended to terminate either any surviving obligation of Licensee or Licensee's obligation to defend and hold Licensor harmless in any prior written agreement between the parties.

### **MISCELLANEOUS**

34.     In the event that Licensee consists of two or more parties, all the covenants and agreements of Licensee herein contained shall be the joint and several covenants and agreements of such parties.

[Intentionally left blank]

35. The waiver by Licensor of the breach of any provision herein by Licensee shall in no way impair the right of Licensor to enforce that provision for any subsequent breach thereof.

Staubach Global Services – RR, Inc. is acting as representative for BNSF Railway Company.

**IN WITNESS WHEREOF**, this License has been duly executed, in duplicate, by the parties hereto as of the day and year first above written.

**BNSF RAILWAY COMPANY**

Staubach Global Services – RR, Inc.,  
its Attorney in Fact  
3017 Lou Menk Drive, Suite 100  
Fort Worth, TX 76131

By: \_\_\_\_\_  
Ed Darter  
Title: Vice President – National Accounts

**STANTEC CONSULTING CORP.**

9400 S.W. Barnes Rd., Suite 200  
Portland, OR 97225

By: \_\_\_\_\_  
Title: \_\_\_\_\_



**Angie Mozart**  
Property Tax, Real Estate,  
Right of Way and Claims  
1232 Park Street, Suite 300  
Paso Robles, CA 93446  
Phone (805) 226-2653  
Fax: (805) 239-4410

**Sent Via Certified Mail**

October 12, 2010

Jones Lang LaSalle  
Attn: Permit Services  
3017 Lou Menk Drive, Suite 100  
Fort Worth, TX 76131-2800

**Re: BNSF Railway Application for Environmental Access Permit**  
**South of NW Doane Avenue and St. Helens Road, Portland, OR**  
**AOC Site #: 0922**  
**Acquisition #: 0608**

Permit Services:


ConocoPhillips Company respectfully submits the attached application and supporting documents to request access to BNSF's manhole-9 (MH-9), located near ConocoPhillips' Willbridge Terminal, #0608, which is located at 5528 NW Doane Avenue in Portland, OR. The Oregon Department of Environmental Quality requires ConocoPhillips Company to conduct storm water sampling, which is described in more detail in the attached work plan letter.

In order to meet the requirements of the BNSF Railway Application for Environmental Access Permit, attached are the following:

1. BNSF Railway Application for Environmental Access Permit
2. Work plan letter dated 10/8/2010 from Stantec Consulting to ConocoPhillips' Site Manager, Rich Solomon
3. Exhibit A – Drawing of ConocoPhillips' Willbridge Terminal that includes MH-9 (duplicates)
4. Exhibit B – Drawing depicting MH-9 in more detail (duplicates)
5. Draft in the amount of \$600.00 for processing fee

Please don't hesitate to contact me if you have any questions regarding this Environmental Access Permit application or the scope of work to be performed. My phone number is (805) 226-2653. You may also email me at [angie.mozart@contractor.conocophillips.com](mailto:angie.mozart@contractor.conocophillips.com). Thank you for your assistance and prompt attention to this important environmental matter.

Sincerely,

  
Angie Mozart, Contracts Associate,  
Principal Technical Services - Approved  
Service Provider for ConocoPhillips Company

Enclosures

cc: Rich Solomon, ConocoPhillips Company, *via email*  
Mark Trewartha and Chris Carlton-Franco, Consultants, Stantec Consulting, *via email*



Date: 10/12/2010

## APPLICATION FOR ENVIRONMENTAL ACCESS PERMIT

Jones Lang LaSalle  
Attn: Permit Services  
3017 Lou Menk Dr., Suite 100  
Fort Worth, TX 76131-2800

APPLICANTS TAX I.D./S.S # [REDACTED]

Name of company/municipality who will occupy the property: ConocoPhillips Company and Stantec Consulting Corp.

Is this a condemning authority? Yes ☐ No ☒

Name of contact: Mark Trewartha Telephone (503) 297-1631 Fax: (503) 297-5429

State in which incorporated: Delaware If not incorporated, please attach name(s) of owners or partners.

Mailing Address: 9400 SW Barnes Road, Suite 200, Portland, OR Zip Code: 97225

Name or nearest town on railroad: Portland Country: Multnomah State: OR

Railroad Mile Post: + Line Segment:  (please complete, if available)

Location of proposed occupancy: N.W. ¼ Sec: 19 Twsp: 1 North Range: 1 East

Manhole-9 is near track change B-1 of the Burlington Northern Railroad, next to the common shed,  
and between NW St. Helen's Road and the ConocoPhillips' Willbridge Terminal.

Is work to be performed within 50 feet of railroad property? Yes ☒ No ☐ What percentage? 100%

How many feet from the track will the work be performed? 20 - 30

Total cost of project: \$ 10,000

Area to Occupy: Approx. 10 feet by 10 feet

Date of occupancy (from/to): One year from date of issue.

Purpose of Testing? (testing for what?): Oregon Department of Environmental Quality has mandated quarterly storm water sampling and monitoring of Manhole-9 to test for petroleum product related constituents.

IS THIS PROJECT ARRA FUNDED? Yes ☐ No ☒

Is applicant a Railroad Shipper? Yes ☒ No ☐

If yes, BNSF Marketing Rep name and number: Adam Hart (281) 203-5904

Was this service requested by BNSF? Yes ☐ No ☒

If yes, who requested? N/A Requestor Telephone Number: N/A

Is this installation in conjunction with a track or track expansion project? Yes ☐ No ☒

If yes, BNSF contact name and number: N/A

The cost of the Environmental Access permit is \$500.00 for sampling purposes and an additional \$1000.00 for placement of monitoring wells, due when the permit had been signed by the Permittee and is ready to be returned for execution. Also, Railroad Protective Insurance is required. This insurance will be offered when the Permit draft is sent. **APPLICANT IS REQUIRED TO PROVIDE COPY OF PROPOSED WORK PLAN. A \$1000.00 deposit may be required and will be returned once BNSF receives copy of the Final Report.**

Signature: 

Printed Name: Frank L. Nichols

Title: Advisor, Western Region, PTRRC, CRE, ConocoPhillips

Phone Number: (805) 226-2644 Fax: (805) 239-4410

If you would like confirmation of your application  
please print your email address:  
angie.mozart@contractor.conocophillips.com

COP0020241



**Stantec**

Stantec Consulting Corporation  
9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Tel: (503) 297-1631  
Fax: (503) 297-5429

October 08, 2010

Mr. Rich Solomon  
Site Manager  
ConocoPhillips Risk Management and Remediation  
3900 Kilroy Airport Way, Suite 210  
Long Beach, CA 90806

**Reference: MH-9 Storm Water Flow Investigation**

Dear: Mr. Solomon

The following letter is meant to provide a brief description of the MH-9 Storm Water Flow Investigation proposed by Stantec Consulting (Stantec) at the ConocoPhillips Willbridge Terminal (Terminal) in Portland, Oregon. By performing a video survey, Stantec will attempt to determine/verify the entry point of the storm water line, located between the warehouse and lower & upper lube cells, into manholes MH-9 and MH-11 onto Burlington Northern Santa Fe Railroad (BNSF) Property and into the City of Portland storm water system. Prior to initiating a video survey of the lines leading into the manhole, sediment and/or standing storm water will be removed from MH-9 by vacuum truck. Sediment and/or water removed from MH-9 will be transported offsite to an approved recycling or disposal facility.

Subsequently, a remote controlled device equipped with a video camera was used to conduct a real-time inspection of the storm water line connecting to MH-11 in attempt to trace the line draining the lube cell area back onto ConocoPhillips property (see attached figure). The same will be completed for the line connecting Separator-001 to MH-9. A check will also be made to verify that MH-9 and MH-11 are connected, as MH-9 is shown to drain into the City of Portland storm water system through a connection to MH-11.

Please feel free to contact the undersigned with any questions or concerns.

Sincerely,

**STANTEC CONSULTING CORPORATION**

Chris Carlton-Franco, M.Sc.  
Staff Scientist  
Tel: (503) 297-1631  
Fax: (503) 297-5429  
[chris.carltonfranco@stantec.com](mailto:chris.carltonfranco@stantec.com)

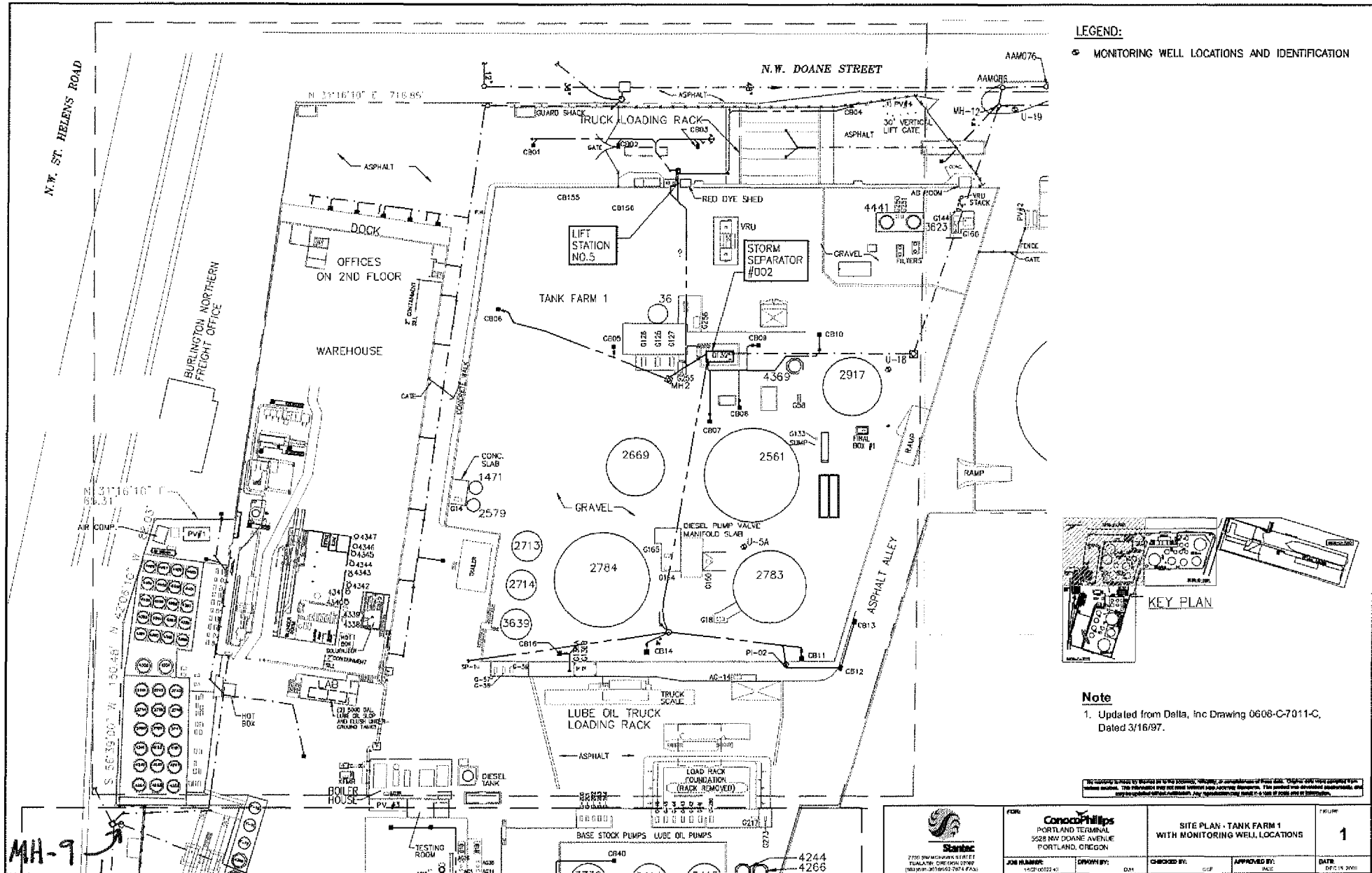
Mark Trewartha, R.G.  
Senior Hydrogeologist  
Tel: (503) 297-1631  
Fax: (503) 297-5429  
[mark.trewartha@stantec.com](mailto:mark.trewartha@stantec.com)

Attachment: Figure

c. Mr. Michael Romero, Oregon Department of Environmental Quality, NW Region Cleanup Section, 2020  
SW Fourth Avenue, Suite 400, Portland, Oregon 97201

**COP0020242**





"EXHIBIT A"

"EXHIBIT B"

**COP002024**

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**From:** Carlton-Franco, Chris  
**Sent:** Tuesday, April 05, 2011 09:25 PM  
**To:** Hetrick, Eric G  
**CC:** Gdak, Chris  
**Subject:** 922-PDX Terminal Dead Leg Project

Eric,

In regards to the Dead Leg Project at the PDX CoP Terminal, I want to make sure I am clear on analyses for disposal and/or characterization purposes. From the sound of things, I am guessing that there will not be much material removed during this project. Most likely the material will consist mainly of gravel fill/road base, unless they excavate fairly deep. If the material is mainly clean gravel (i.e. no obvious petroleum product visible on the gravel), it can go straight to the landfill without analysis. If there is some native soil contained in the excavated material or there is suspected contamination, it will need to be sampled and analyzed for waste profile purposes. I would normally request the following analyses for waste profile purposes:

- NWTPH-Gx;
- NWTPH-Dx w/ silica gel cleanup;
- 8260B RBDM VOCs;
- 8270 SIM PAHs;
- TCLP Lead; and
- TCLP Benzene.

Also, the normal turn around time for the listed analyses is about two weeks. I want to make sure that the Terminal is prepared to store the soil on-Site for this period of time. I would suggest some 55-gallon drums or a small roll-off bin, otherwise the material will need to be on top of and covered with visquine/plastic.

Thanks,

Chris

Chris Carlton-Franco, M.Sc.  
Staff Scientist  
Stantec

Ph: (503) 297-1631 Ext. 212  
Fx: (503) 297-5429  
Cell: (503) 881-4193  
chris.carltonfranco@stantec.com

stantec.com <<http://www.stantec.com>>

The content of this email is the confidential property of Stantec and should not be copied, modified, retransmitted, or used for any purpose except with Stantec's written authorization. If you are not the intended recipient, please delete all copies and notify us immediately.

**COP0020245**

ü Please consider the environment before printing this email.

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**From:** Fossum, Jeff E  
**Sent:** Tuesday, May 03, 2011 06:44 PM  
**To:** Hetrick, Eric G  
**Subject:** FW:  
**Attachments:** 2011050313392416.pdf

ConocoPhillips vision for the path forward at their Portland Terminal has many options. The development of the Dock ranks high in the concerns of COP management. The steps taken will depend on the assets available, necessary investment and the potential return. Because of the dynamic nature of these parameters it is difficult to say what our electrical power consumption at the Dock will be in the future. We may have a 25 kVA increase or a 50 kVA increase. But one thing that we can definitely say is that we need to keep our development options open.

Sorry about the delay.

Jeff Fossum  
Maintenance Tech.  
ConocoPhillips Terminal  
5528 N.W. Doane  
Portland, Oregon 97210  
503.248.1558

---

From: Fossum, Jeff E  
Sent: Tuesday, May 03, 2011 11:39 AM  
To: Fossum, Jeff E  
Subject:

**COP0020247**



## Request for Upgrade or Relocation of Existing Commercial Service

### Portland General Electric

**Applicant Information:** Date: \_\_\_\_\_ PGE Work Request No. \_\_\_\_\_  
 Customer Name: \_\_\_\_\_ E-Mail: \_\_\_\_\_  
 Service Address: \_\_\_\_\_ City: \_\_\_\_\_  
 Nearest Cross Street: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Existing Customer Account Number: \_\_\_\_\_ Meter Number(s): \_\_\_\_\_

**Contact Information:** (If different from Billing Information, such as on-site Electrical Contractor, Engineer, Architect, etc.)

Name: \_\_\_\_\_ Company Name: \_\_\_\_\_  
 Mailing Address: \_\_\_\_\_ City: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone Number(s): \_\_\_\_\_ E-Mail: \_\_\_\_\_

**Service Information:**

Estimated Connection Date: \_\_\_\_\_

Existing Size: \_\_\_\_\_ Amps Voltage: 480 Single Phase [ ] Three Phase [☒] Overhead [ ] Underground [☒]  
 Requested Size: \_\_\_\_\_ Amps Voltage: 480 Single Phase [ ] Three Phase [☒] Overhead [ ] Underground [☒]  
 Temporary Service Needed [ ]  
 Operating Hours: One Shift [ ] Two Shifts [ ] Continuous [☒] Other: \_\_\_\_\_

**LOAD DATA MUST BE IN WATTS OR KW IN ORDER TO PROCESS THIS REQUEST**

New Connected Load (Typical conversion factor: 1hp=1ton=1kw)				
Load Type	1-Phase	3-Phase	Hp/Tons	Connected KW
Lighting				
Receptacles				
Water Heating				
Cooking				
Electric Heat				
Refrigeration/HVAC				
-Largest size				
Motors*				
-Largest size				
Welders				
-Largest size				
Computers				
Elevators				
Other Loads <i>Future</i>		<i>480</i>		<i>≈ 40 KW</i>
Total Connected KW				

A Scaled Site Plan Showing Preferred Ground Level Service and Meter Location is Required along with a Detailed Drawing of Switchgear and Electrical Room Specifications, if Applicable.

(include on-line electrical diagram)

\*\*Please see Requirements for Electronic Files\*\*

Cost of design changes due to inadequate/inaccurate information will be borne by the property owner or electrician. Load data forms without plans may be delayed and/or not processed. Site grading, utility, and landscaping plans are required to complete PGE electrical design)

Customer Signature: \_\_\_\_\_ Date: \_\_\_\_\_

(Must have signature to process)

Tri-County Service Coordinators: 3700 SE 17th Ave, Portland, OR 97202 Office 503-736-5450 Fax 503-736-5451 or 503-736-5452  
 Southern Region Service Coordinators: 4245 Kale St NE, Salem, OR 97035 Office 503-463-4348 Fax 503-463-4308



## Request for Upgrade or Relocation of Existing Commercial Service

### Portland General Electric

**Applicant Information:** Date: \_\_\_\_\_ PGE Work Request No. \_\_\_\_\_  
 Customer Name: \_\_\_\_\_ E-Mail: \_\_\_\_\_  
 Service Address: \_\_\_\_\_ City: \_\_\_\_\_  
 Nearest Cross Street: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Existing Customer Account Number: \_\_\_\_\_ Meter Number(s): \_\_\_\_\_

**Contact Information:** (If different from Billing Information, such as on-site Electrical Contractor, Engineer, Architect, etc.)

Name: \_\_\_\_\_ Company Name: \_\_\_\_\_  
 Mailing Address: \_\_\_\_\_ City: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone Number(s): \_\_\_\_\_ E-Mail: \_\_\_\_\_

**Service Information:**

Estimated Connection Date: \_\_\_\_\_

Existing Size: \_\_\_\_\_ Amps Voltage: 480 Single Phase [ ] Three Phase [☒] Overhead [ ] Underground [☒]  
 Requested Size: \_\_\_\_\_ Amps Voltage: 480 Single Phase [ ] Three Phase [☒] Overhead [ ] Underground [☒]  
 Temporary Service Needed [ ]  
 Operating Hours: One Shift [ ] Two Shifts [ ] Continuous [☒] Other: \_\_\_\_\_

**LOAD DATA MUST BE IN WATTS OR KW IN ORDER TO PROCESS THIS REQUEST**

New Connected Load (Typical conversion factor: 1hp=1ton=1kw)				
Load Type	1-Phase	3-Phase	Hp/Tons	Connected KW
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Refrigeration/HVAC				
-Largest size				
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Welders				
-Largest size				
Computers				
Elevators				
Other Loads <i>Future</i>		<u>480</u>		<u>≈ 40 KW</u>
Total Connected KW				

A Scaled Site Plan Showing Preferred Ground Level Service and Meter Location is Required along with a Detailed Drawing of Switchgear and Electrical Room Specifications, if Applicable.

(include on-line electrical diagram)

\*\*Please see Requirements for Electronic Files\*\*

Cost of design changes due to inadequate/inaccurate information will be borne by the property owner or electrician. Load data forms without plans may be delayed and/or not processed. Site grading, utility, and landscaping plans are required to complete PGE electrical design)

Customer Signature: \_\_\_\_\_ Date: \_\_\_\_\_

(Must have signature to process)

Tri-County Service Coordinators: 3700 SE 17th Ave, Portland, OR 97202 Office 503-736-5450 Fax 503-736-5451 or 503-736-5452  
 Southern Region Service Coordinators: 4245 Kale St NE, Salem, OR 97035 Office 503-463-4348 Fax 503-463-4308

---

**From:** Sprick, Grant  
**Sent:** Friday, May 06, 2011 03:11 PM  
**To:** Hetrick, Eric G  
**CC:** Misakian, Mike  
**Subject:** RE: PGE Document  
**Attachments:** Willbridge - PGE Upgrade Form.pdf; Willbridge Drawings.pdf

Eric. Thank you for coordinating the completion of this form. We followed up with PGE to see exactly what they will need to size the new service. There are a couple of points that I want to bring to your attention. Mike, please correct me if I misspeak.

- PGE is asking for a combined new service load. As such, we combined what you provided with the details of our new remediation system. That combined form is attached.

- o Please use this form to complete the contact information section. Not the form that you provided.

- Is there any way that you can provide load for the existing service (warehouse and dock area). We want to be sure that service we request will be able to handle everything. We just don't want to request a 200 amp service and actually need more.

Again, thanks for your assistance with this.

-grant

Grant V. Sprick, P.E. | Certified Project Manager I | [grant.sprick@arcadis-us.com](mailto:grant.sprick@arcadis-us.com)  
<<mailto:grant.sprick@arcadis-us.com>>

ARCADIS U.S., Inc. | 111 SW Columbia Street, Suite 670 | Portland, Oregon 97213  
T: 503 220 8201 x1104 | M: 503 539 8616  
[www.arcadis-us.com](http://www.arcadis-us.com) <<http://www.arcadis-us.com/>>

ARCADIS, Imagine the result

Professional Registration/PE-OR, 78790PE | PE-UT, 7684484-2202

Please consider the environment before printing this email.

From: Hetrick, Eric G [<mailto:Eric.G.Hetrick@conocophillips.com>]  
Sent: Wednesday, May 04, 2011 9:12 AM  
To: Sprick, Grant  
Subject: PGE Document

Grant,

Please review what Jeff has provided and let me know if this will pass the test with PGE. If it will, I'll complete the rest of the form, just let me know.

**COP0020250**



Thanks,  
Eric

Eric G. Hetrick  
Site Manager - Risk Management and Remediation  
ConocoPhillips Company  
76 Broadway  
Sacramento, CA 95818  
916-558-7604 (office)  
916-307-3450 (cell)  
916-558-7639 (fax)  
Eric.G.Hetrick@conocophillips.com

RM&R Safety Principles:

- Report to work physically rested and mentally alert.
- Observe and coach your co-workers to ensure that they work safely.
- Do not improvise or take short cuts - follow procedures.
- There is zero tolerance for willful unsafe actions.
- Stop all unsafe work.

---

From: Fossum, Jeff E  
Sent: Tuesday, May 03, 2011 11:45 AM  
To: Hetrick, Eric G  
Subject: FW:

ConocoPhillips vision for the path forward at their Portland Terminal has many options. The development of the Dock ranks high in the concerns of COP management. The steps taken will depend on the assets available, necessary investment and the potential return. Because of the dynamic nature of these parameters it is difficult to say what our electrical power consumption at the Dock will be in the future. We may have a 25 kVA increase or a 50 kVA increase. But one thing that we can definitely say is that we need to keep our development options open.

Sorry about the delay.

Jeff Fossum  
Maintenance Tech.  
ConocoPhillips Terminal  
5528 N.W. Doane  
Portland, Oregon 97210  
503.248.1558

---

From: Fossum, Jeff E  
Sent: Tuesday, May 03, 2011 11:39 AM

**COP0020251**

To: Fossum, Jeff E  
Subject:

---

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**COP0020252**



## Requirements for Upgrade or Relocation of Commercial Electric Service

### Portland General Electric

#### Customer Tasks:

1. Obtain building/electrical permits from the appropriate County/City department. Obtain easements and/or tree-trimming permits if required.
2. Provide a plot/site plan to scale which was submitted for building permit. Include detail of electrical rooms and switchboards for PGE acceptance. If available, include electronic file of site plan (see "requirements for electronic files").
3. Complete the "**Request for Upgrade or Relocation of Existing Commercial Service**" form.
4. A signed PGE cost agreement may be required. If so, payment must be made before PGE will schedule work to begin.
5. All costs associated with trenching, pads, vaults, conduit, road crossings, and permits. Before proceeding with trenching, please contact your Service & Design Consultant for design approval.
6. Right-of-Way excavation must be performed by a PGE approved contractor. Contact your Service and Design Consultant for details.
7. Arrange a pre-construction meeting at the job site between the chosen excavation contractor and PGE.
8. Obtain PGE inspection and approval of trench, conduit, and vault systems before backfill.
9. After passing the appropriate governing agency electrical inspection, please request a PGE inspection by calling 503-736-5450 for Tri-County area or 503-463-4348 for Salem area. (*PGE cannot energize until both inspections have passed.*)
10. Contact the Oregon Utility Notification Center (OUNC) for location underground lines: Call 811 or 1-800-332-2344. In the Portland Metro area call 503-246-6699.

#### PGE Tasks:

1. PGE will prepare an installation design (please allow 60 days) and determine customer cost from PGE, if any.
2. PGE will inspect all electrical services, trench, conduit, and vault systems upon customer request.
3. PGE will schedule service connection after all customer responsibilities have been met.



## Request for Upgrade or Relocation of Existing Commercial Service

### Portland General Electric

**Applicant Information:** Date: 5/5/2011 PGE Work Request No. \_\_\_\_\_  
 Customer Name: ConocoPhillips Company E-Mail: \_\_\_\_\_  
 Service Address: 5528 NW Doane City: Portland  
 Nearest Cross Street NW Front Zip: 97210  
 Existing Customer Account Number: \_\_\_\_\_ Meter Number(s): 31011211

**Contact Information:** (If different from Billing Information, such as on-site Electrical Contractor, Engineer, Architect, etc.)

Name: Mike Misakian Company Name: ARCADIS  
 Mailing Address: 140 Second St. Suite 200 City: Petaluma, CA Zip: 94952  
 Phone Number(s): 707-776-0865 extension 30 E-Mail: Mike.Misakian@arcadis-us.com

**Service Information:** Estimated Connection Date: \_\_\_\_\_  
 Existing Size: 100 Amps Voltage: 480 Single Phase [ ] Three Phase [X] Overhead [X] Underground [ ]  
 Requested Size: 200 Amps Voltage: 480 Single Phase [ ] Three Phase [X] Overhead [X] Underground [ ]  
 Temporary Service Needed [ ]  
 Operating Hours: One Shift [ ] Two Shifts [ ] Continuous [X] Other: \_\_\_\_\_

**LOAD DATA MUST BE IN WATTS OR KW IN ORDER TO PROCESS THIS REQUEST**

New Connected Load (Typical conversion factor: 1hp=1ton=1kw)				
Load Type	1-Phase	3-Phase	Hp/Tons	Connected KW
Lighting	1.8			1.8
Receptacles				
Water Heating				
Cooking				
Electric Heat				
Refrigeration/HVAC	15			15
-Largest size				
Motors*	4	5.14		9.14
-Largest size	1	5.14		
Welders				
-Largest size				
Computers				
Elevators				
Other Loads <b>Future</b>		40		40
<b>Total Connected KW</b>				<b>65.94</b>

A Scaled Site Plan Showing Preferred Ground Level Service and Meter Location is Required along with a Detailed Drawing of Switchgear and Electrical Room Specifications, if Applicable.

(include on-line electrical diagram)

\*\*Please see Requirements for Electronic Files\*\*

Cost of design changes due to inadequate/inaccurate information will be borne by the property owner or electrician.  
 Load data forms without plans may be delayed and/or not processed. Site grading, utility, and landscaping plans are required to complete PGE electrical design)

Customer Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 (Must have signature to process)

Tri-County Service Coordinators: 3700 SE 17th Ave, Portland, OR 97202 Office 503-736-5450 Fax 503-736-5451 or 503-736-5452  
 Southern Region Service Coordinators: 4245 Kale St NE, Salem, OR 97035 Office 503-463-4348 Fax 503-463-4308



# **LIGHTING & POWER PLANS**

- HYVAC LIGHTING FIXTURE
- DUPLEX 120V RECEPTACLE
- SINGLE POLE SWITCH
- PHOTO CELL
- JUNCTION BOX OR PULL BOX
- MOTOR (SINGLE-LINE DIAG., HP INDICATED)
- POWER PANEL OR LIGHTING PANEL
- CONDUIT
- GROUND CABLE
- HANDHOLE
- GROUND ROD
- GROUNDING POINT
- HOME RUN TO PANEL, HASHMARKS INDICATE NO. OF CIRCUITS (CROSSED = GROUND, SHORT = PHASE, LONG = NEUTRAL)
- DISCONNECT, MECHANICAL
- CIRCUIT BREAKER, THERMAL MAGNETIC, AMPACITY INDIC.
- WATTHOUR METER
- THERMOSTAT

## **ABBREVIATIONS**

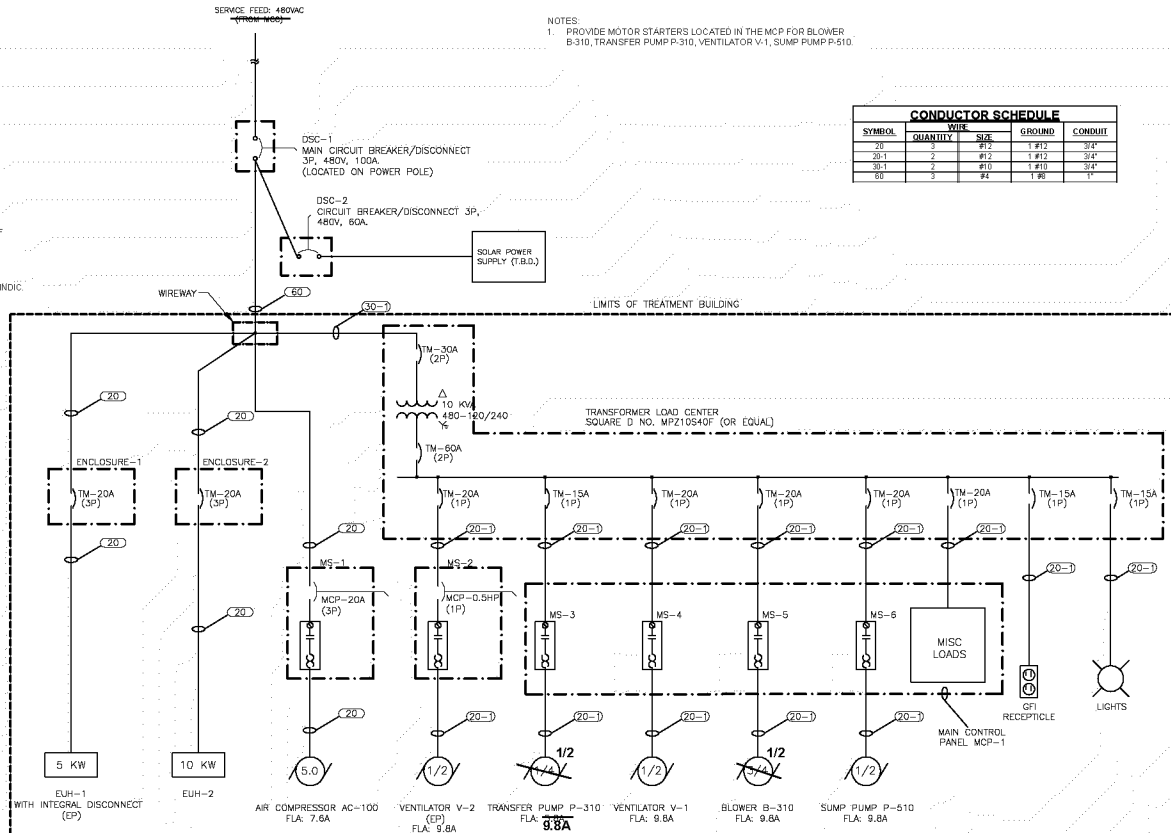
- A, AMP AMPERE
- AC ALTERNATING CURRENT
- AIC AMPERE INTERRUPTING CAPACITY
- AWG AMERICAN WIRE GAUGE
- BLDG BUILDING
- C-X CONDUIT, CONTROL
- EP EXPLOSION PROOF
- EUH ELECTRIC UNIT HEATER
- FLA FULL LOAD AMPS
- IND GROUND
- HP HORSEPOWER
- HVAC HEATING, VENTILATION, AIR CONDITIONING
- I-X CONDUIT, INSTRUMENT
- JBX JUNCTION BOX, INSTRUMENT
- JBX-CX JUNCTION BOX, 120V CONTROL
- MCP-20 HP MOTOR CIRCUIT PROTECTOR - HP INDICATED
- MCP MAIN CONTROL PANEL
- MS MOTOR STARTER
- P-X CONDUIT, POWER
- RGS RIGID GALVANIZED STEEL
- S.N. SERVICE NEUTRAL
- V VOLTS
- VAC VOLTS ALTERNATING CURRENT
- XFMR TRANSFORMER

SERVICE FEED, 480VAC

## **NOTES:**

1. PROVIDE MOTOR STARTERS LOCATED IN THE MCP FOR BLOWER B-310, TRANSFER PUMP P-310, VENTILATOR V-1, SUMP PUMP P-510

CONDUCTOR SCHEDULE					
SYMBOL	QUANTITY	WIRE	GROUND	CONDUIT	
20	3	#12	1 #12	3/4"	
20-1	2	#12	1 #12	3/4"	
30-1	2	#12	1 #12	3/4"	
60	3	#4	1 #4	1"	



**DRAFT**



ARCADIS U.S., INC.

CH2M HILL ENVIRONMENTAL MANAGEMENT COMPANY, PORTLAND, OREGON  
GROUNDWATER EXTRACTION AND TREATMENT SYSTEM WILLERBICK TERMINAL, Nos. 1001868 & 35497  
90% DESIGN DRAWINGS

## **SINGLE-LINE DRAWING**

ELECTRICAL

ARCADIS Project No.  
000-000000-000000  
Date:  
NOVEMBER 2011  
ARCADIS  
11111 Columbia Street  
Portland, OR 97201  
TEL: 503-228-2201

**E-2**

**COP0020256**



## Requirements for Upgrade or Relocation of Commercial Electric Service

### Portland General Electric

#### **Customer Tasks:**

1. Obtain building/electrical permits from the appropriate County/City department. Obtain easements and/or tree-trimming permits if required.
2. Provide a plot/site plan to scale which was submitted for building permit. Include detail of electrical rooms and switchboards for PGE acceptance. If available, include electronic file of site plan (see "requirements for electronic files").
3. Complete the "**Request for Upgrade or Relocation of Existing Commercial Service**" form.
4. A signed PGE cost agreement may be required. If so, payment must be made before PGE will schedule work to begin.
5. All costs associated with trenching, pads, vaults, conduit, road crossings, and permits. Before proceeding with trenching, please contact your Service & Design Consultant for design approval.
6. Right-of-Way excavation must be performed by a PGE approved contractor. Contact your Service and Design Consultant for details.
7. Arrange a pre-construction meeting at the job site between the chosen excavation contractor and PGE.
8. Obtain PGE inspection and approval of trench, conduit, and vault systems before backfill.
9. After passing the appropriate governing agency electrical inspection, please request a PGE inspection by calling 503-736-5450 for Tri-County area or 503-463-4348 for Salem area. (*PGE cannot energize until both inspections have passed.*)
10. Contact the Oregon Utility Notification Center (OUNC) for location underground lines: Call 811 or 1-800-332-2344. In the Portland Metro area call 503-246-6699.

#### **PGE Tasks:**

1. PGE will prepare an installation design (please allow 60 days) and determine customer cost from PGE, if any.
2. PGE will inspect all electrical services, trench, conduit, and vault systems upon customer request.
3. PGE will schedule service connection after all customer responsibilities have been met.



## Request for Upgrade or Relocation of Existing Commercial Service

### Portland General Electric

**Applicant Information:** Date: 5/5/2011 PGE Work Request No. \_\_\_\_\_  
 Customer Name: ConocoPhillips Company E-Mail: \_\_\_\_\_  
 Service Address: 5528 NW Doane City: Portland  
 Nearest Cross Street NW Front Zip: 97210  
 Existing Customer Account Number: \_\_\_\_\_ Meter Number(s): 31011211

Contact Information: (If different from Billing Information, such as on-site Electrical Contractor, Engineer, Architect, etc.)

Name: Mike Misakian Company Name: ARCADIS  
 Mailing Address: 140 Second St. Suite 200 City: Petaluma, CA Zip: 94952  
 Phone Number(s): 707-776-0865 extension 30 E-Mail: Mike.Misakian@arcadis-us.com

**Service Information:** Estimated Connection Date: \_\_\_\_\_  
 Existing Size: 100 Amps Voltage: 480 Single Phase ☐ Three Phase ☒ Overhead ☒ Underground ☐  
 Requested Size: 200 Amps Voltage: 480 Single Phase ☐ Three Phase ☒ Overhead ☒ Underground ☐  
 Temporary Service Needed ☐  
 Operating Hours: One Shift ☐ Two Shifts ☐ Continuous ☒ Other: \_\_\_\_\_

**LOAD DATA MUST BE IN WATTS OR KW IN ORDER TO PROCESS THIS REQUEST**

New Connected Load (Typical conversion factor: 1hp=1ton=1kw)				
Load Type	1-Phase	3-Phase	Hp/Tons	Connected KW
Lighting	1.8			1.8
Receptacles				
Water Heating				
Cooking				
Electric Heat				
Refrigeration/HVAC	15			15
-Largest size				
Motors*	4	5.14		9.14
-Largest size	1	5.14		
Welders				
-Largest size				
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Other Loads <b>Future</b>		40		40
<b>Total Connected KW</b>				<b>65.94</b>

A Scaled Site Plan Showing Preferred Ground Level Service and Meter Location is Required along with a Detailed Drawing of Switchgear and Electrical Room Specifications, if Applicable.

(include on-line electrical diagram)

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Cost of design changes due to inadequate/inaccurate information will be borne by the property owner or electrician.  
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Customer Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 (Must have signature to process)

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 Southern Region Service Coordinators: 4245 Kale St NE, Salem, OR 97035 Office 503-463-4348 Fax 503-463-4308





# **LIGHTING & POWER PLANS**

- HYVAC LIGHTING LIGHTING FIXTURE
- DUPLEX 120V RECEPTACLE
- SINGLE POLE SWITCH
- PHOTO CELL
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- GROUNDING POINT
- HOME RUN TO PANEL, HASHMARKS INDICATE NO. OF CIRCUITS (CROSSED = GROUND, SHORT = PHASE, LONG = NEUTRAL)
- DISCONNECT, MECHANICAL
- CIRCUIT BREAKER, THERMAL MAGNETIC, AMPACITY INDIC.
- WATTHOUR METER
- THERMOSTAT

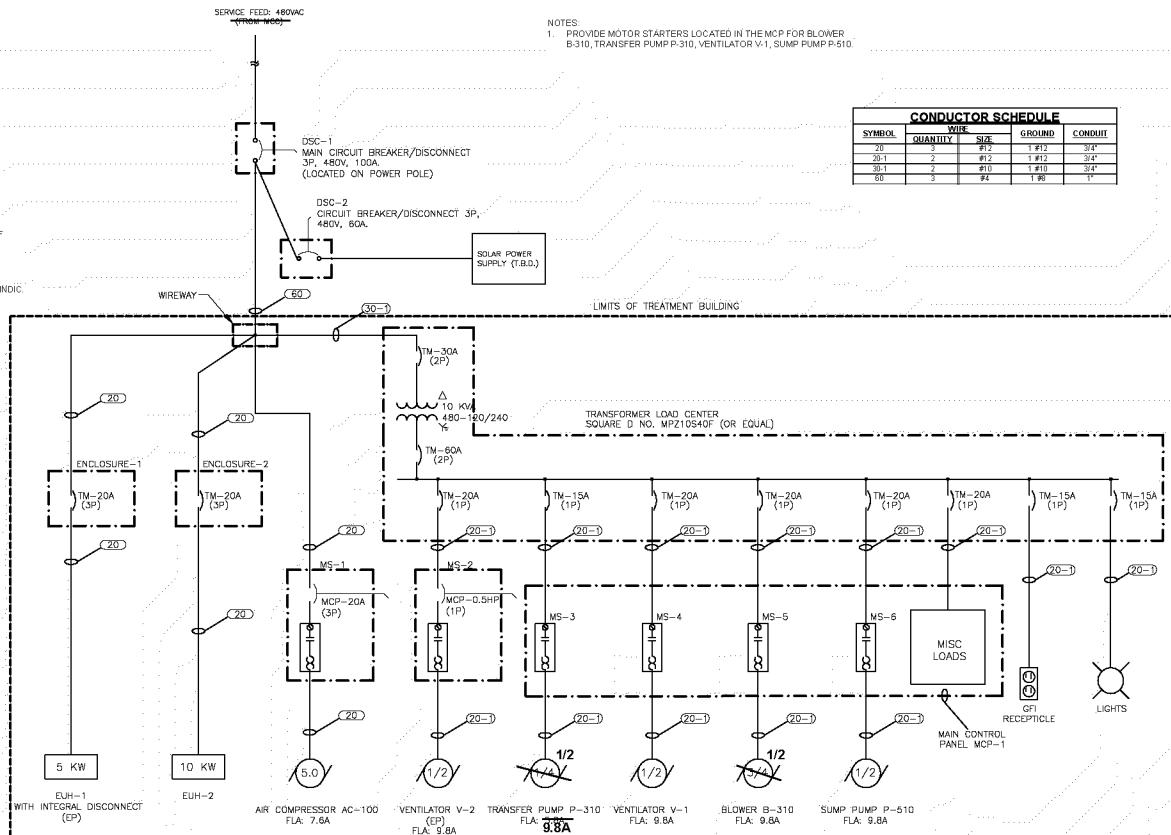
## **ABBREVIATIONS**

- A, AMP AMPERE
- AC ALTERNATING CURRENT
- AIC AMPERE INTERRUPTING CAPACITY
- AWG AMERICAN WIRE GAUGE
- BLDG BUILDING
- C-X CONDUIT, CONTROL
- EP EXPLOSION PROOF
- EUH ELECTRIC UNIT HEATER
- FLA FULL LOAD AMPS
- GND GROUND
- HP HORSEPOWER
- HVAC HEATING, VENTILATION, AIR CONDITIONING
- I-X CONDUIT, INSTRUMENT
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- P-X CONDUIT, POWER
- RGS RIGID GALVANIZED STEEL
- S.N. SERVICE NEUTRAL
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## **NOTES:**

1. PROVIDE MOTOR STARTERS LOCATED IN THE MCP FOR BLOWER B-310, TRANSFER PUMP P-310, VENTILATOR V-1, SUMP PUMP P-510

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**DRAFT**



ARCADIS U.S., INC.

CHRYSLER ENVIRONMENTAL MANAGEMENT COMPANY, PORTLAND, OREGON  
GROUNDWATER EXTRACTION AND TREATMENT SYSTEM WILLERIDGE TERMINAL, Nos. 1001868 & 35497  
90% DESIGN DRAWINGS

## **SINGLE-LINE DRAWING**

ELECTRICAL

ARCADIS Project No.  
000-000000-000000  
Date:  
NOVEMBER 2011  
ARCADIS  
11111 Columbia Street  
Portland, OR 97201  
TEL: 503-228-0001

**E-2**

**COP0020260**

---

**From:** Fossum, Jeff E  
**Sent:** Monday, May 09, 2011 10:03 PM  
**To:** Hetrick, Eric G  
**CC:** Lyons, Thomas  
**Subject:** RE: PGE Document

Based on the information that I have received from PGE, (3/2010 - 2/2011) the highest month was 3/2010 at 33 kW. But the bar graph on the 3/2010 bill shows a higher average and a much higher peak over the year prior to 3/2010.

Jeff Fossum  
Maintenance Tech.  
ConocoPhillips Terminal  
5528 N.W. Doane  
Portland, Oregon 97210  
503.248.1558

---

From: Hetrick, Eric G  
Sent: Monday, May 09, 2011 9:34 AM  
To: Fossum, Jeff E  
Cc: Lyons, Thomas  
Subject: PGE Document  
Importance: High

Jeff,  
Thanks a million for responding with the information that PGE is requesting. I forwarded the form to them and I received one additional question that I'm hoping you can provide a response to:

Is there any way that you can provide load for the existing service (warehouse and dock area). We want to be sure that service we request will be able to handle everything. We just don't want to request a 200 amp service and actually need more.

Do you know what the existing load is at the warehouse and dock area? I don't think we need to know what the loads are for, just the total.

Thanks in advance for your rapid response,  
Eric

Eric G. Hetrick  
Site Manager - Risk Management and Remediation  
ConocoPhillips Company  
76 Broadway  
Sacramento, CA 95818  
916-558-7604 (office)  
916-307-3450 (cell)  
916-558-7639 (fax)  
Eric.G.Hetrick@conocophillips.com

RM&R Safety Principles:

- \* Report to work physically rested and mentally alert.
- \* Observe and coach your co-workers to ensure that they work safely.
- \* Do not improvise or take short cuts - follow procedures.
- \* There is zero tolerance for willful unsafe actions.
- \* Stop all unsafe work.

**COP0020261**

---

From: Fossum, Jeff E  
Sent: Tuesday, May 03, 2011 11:45 AM  
To: Hetrick, Eric G  
Subject: FW:

ConocoPhillips vision for the path forward at their Portland Terminal has many options. The development of the Dock ranks high in the concerns of COP management. The steps taken will depend on the assets available, necessary investment and the potential return. Because of the dynamic nature of these parameters it is difficult to say what our electrical power consumption at the Dock will be in the future. We may have a 25 kVA increase or a 50 kVA increase. But one thing that we can definitely say is that we need to keep our development options open.

Sorry about the delay.

Jeff Fossum  
Maintenance Tech.  
ConocoPhillips Terminal  
5528 N.W. Doane  
Portland, Oregon 97210  
503.248.1558

---

From: Fossum, Jeff E  
Sent: Tuesday, May 03, 2011 11:39 AM  
To: Fossum, Jeff E  
Subject:

**COP0020262**

---

**From:** Hetrick, Eric G  
**Sent:** Monday, May 16, 2011 04:16 PM  
**To:** Brown, Stanley V; Uyeda, Valerie J  
**CC:** Knipper, Ralph E; Devito, Mike J; Lyons, Thomas; Mike Webber  
**Subject:** RE: Portland Dead Leg - will start work on 5/23/11  
**Importance:** High

All,  
FYI the below notice with respect to the additional dead leg work in TF #3 was submitted to Mr. Mike Romero of the ODEQ on Friday, May 13th. Please let me know if you have any other questions/needs.

Best Regards,  
Eric

Eric G. Hetrick  
Site Manager - Risk Management and Remediation  
ConocoPhillips Company  
76 Broadway  
Sacramento, CA 95818  
916-558-7604 (office)  
916-307-3450 (cell)  
916-558-7639 (fax)  
Eric.G.Hetrick@conocophillips.com

RM&R Safety Principles:

- Report to work physically rested and mentally alert.
- Observe and coach your co-workers to ensure that they work safely.
- Do not improvise or take short cuts - follow procedures.
- There is zero tolerance for willful unsafe actions.
- Stop all unsafe work.

Mike,

The Portland dead leg project scope of work has increased to include an area in Tank Farm 3. The additional work will involve removing some pipe supports and footings and may require digging down to about 3 feet. I will keep you posted.

Mark Trewartha, RG  
Senior Hydrogeologist  
Stantec

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
Fx: (503) 297-5429  
Cell: (503) 807-8568  
mark.trewartha@stantec.com

stantec.com <<http://www.stantec.com/>>

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**COP0020263**

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From: Brown, Stanley V  
Sent: Friday, May 13, 2011 9:44 AM  
To: Uyeda, Valerie J; Hetrick, Eric G  
Cc: Knipper, Ralph E; Devito, Mike J; Lyons, Thomas; Mike Webber  
Subject: RE: Portland Dead Leg - will start work on 5/23/11

Thanks Val. Sorry again for the confusion. Mike please note that a 5 day notice needs to be done so the earliest we can start the support removal is May 23. Please confirm with me that we have approval before doing any digging on this extra work. Thanks.

Stan Brown  
ConocoPhillips  
Major Maintenance Superintendent  
562-290-1548-Office  
310-345-6776-Cell

---

From: Uyeda, Valerie J  
Sent: Friday, May 13, 2011 9:41 AM  
To: Hetrick, Eric G  
Cc: Brown, Stanley V; Knipper, Ralph E; Devito, Mike J; Lyons, Thomas; Mike Webber  
Subject: Portland Dead Leg - will start work on 5/23/11

Eric:

Can you please have Stantec notify DEQ that we may need to do some hand digging to remove some old concrete footings as a continuing effort to remove dead leg piping at Portland? This work will occur in Tank Farm 3 as described below. Please confirm that DEQ has been notified and let us know if Stantec will need to do any sampling of these areas. Thank you and sorry for any confusion on this project.

- Val -

---

From: Mike Webber [mailto:mikwebber@comcast.net]  
Sent: Friday, May 13, 2011 9:07 AM  
To: Uyeda, Valerie J  
Cc: Brown, Stanley V; Devito, Mike J; Knipper, Ralph E; 'Scott White'  
Subject: Changes in Scope of Work - Portland Dead Leg Project

Hi Val,

The scope of work for the Portland Deadleg Project recently changed. As we discussed on the phone today, part of that change will be removing and disposing tank piping, pipe supports and their footers. I've attached a photo for reference.

The piping consist of approximately 100 lf of 8" pipe which most recently contained black oil. We anticipate washing and pigging the pipe and cold cutting it into lengths for a roll off.

There are also 8 single pipe supports and 3 double pipe supports which will require hand digging to

**COP0020264**

remove their concrete footers.

These footers and piping are located in Tank Farm 3, between tanks 4252 & 4253, approximately 6 feet away from each tank. We estimate the depth of the footers at 3 feet each.

Will you make the necessary arrangements for permitting the hand digging and advise how to proceed?

Thanks for all your help with this.

Regards,

Mike

Mike Webber, CFR

423-505-6897

mikwebber@comcast.net

**COP0020265**

---

**From:** Trewartha, Mark  
**Sent:** Monday, May 23, 2011 11:45 PM  
**To:** ROMERO Mike  
**CC:** Hetrick, Eric G; Lyons, Thomas; Uyeda, Valerie J; Hetrick, Eric G; Gdak, Chris; Carlton-Franco, Chris  
**Subject:** FW: excavation

Mike,

See below. Stantec will be onsite tomorrow morning to collect samples and inspect the excavation.

Mark Trewartha, RG  
Senior Hydrogeologist  
Stantec

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
Fx: (503) 297-5429  
Cell: (503) 807-8568  
mark.trewartha@stantec.com

stantec.com <<http://www.stantec.com>>

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ü Please consider the environment before printing this email.

From: Fossum, Jeff E [mailto:Jeff.E.Fossum@conocophillips.com]  
Sent: Monday, May 23, 2011 4:12 PM  
To: Hetrick, Eric G; Trewartha, Mark; Uyeda, Valerie J  
Cc: Lyons, Thomas  
Subject: excavation

We are having problems with our tank gauging system on a high use tank in tank farm one.

We have traced it to a problem with a cable in an underground conduit.

We have excavated down to the Red Concrete that covers the conduit (1'Wx18"Dx30'L).

All excavated material is on and covered by visqueen.

**COP0020266**



Please advise as to further action.

Jeff Fossum  
Maintenance Tech.  
ConocoPhillips Terminal  
5528 N.W. Doane  
Portland, Oregon 97210  
503.248.1558

**COP0020267**

---

**From:** ROMERO Mike  
**Sent:** Wednesday, July 13, 2011 12:23 AM  
**To:** Hetrick, Eric G  
**CC:** THIESSEN Kenneth  
**Subject:** RE: Portland dirt removal - Lubes piping in Tank Farm 3  
**Attachments:** image001.jpg; image002.jpg; image003.jpg; image004.jpg; image005.jpg; image006.jpg

Thanks Eric,

The intent of the Contaminated Media Management Plan that Conoco Phillips developed was to identify potentially contaminated media when on-site activities occur and to ensure that it is being handled in a manner that is safe to on-site workers and that it disposed of properly if it contains regulated hazardous substances. One other project specific goal at this facility was to also identify potential contamination source areas that may be contributing contaminants of concern to an exposure/transport pathway under investigation at the site. The typical pathways at this site would be groundwater (migration to river) and stormwater (soil erosion). If contaminations was indentified, it could be an opportunity to remove it and therefore help the overall goal of Source Control at the site. The removal may also help protect on-site workers by eliminating their potential future exposure.

There appears to be some stained soil in the photographs. If you already plan on removing it, you should characterize it as you would at any site where releases of hazardous substances have occurred. If it turns up contaminated, you can choose to follow Conoco Phillips site specific contaminated Media Management Plan. If you plan on reusing the soil on site, take care to ensure worker safety and do not make it more available for erosion to the stormwater or other exposure pathways.

Mike

From: Hetrick, Eric G [mailto:Eric.G.Hetrick@conocophillips.com]  
Sent: Monday, July 11, 2011 8:36 AM  
To: ROMERO Mike  
Subject: FW: Portland dirt removal - Lubes piping in Tank Farm 3  
Importance: High

Mike,

Here is the e-mail I sent last week. Let me know if you have any questions.

Thanks,  
Eric

Eric G. Hetrick  
Site Manager - Risk Management and Remediation  
ConocoPhillips Company  
76 Broadway  
Sacramento, CA 95818

**COP0020268**

916-558-7604 (office)

916-307-3450 (cell)

916-558-7639 (fax)

Eric.G.Hetrick@conocophillips.com

RM&R Safety Principles:

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- Do not improvise or take short cuts - follow procedures.
- There is zero tolerance for willful unsafe actions.
- Stop all unsafe work.

---

From: Hetrick, Eric G

Sent: Friday, July 08, 2011 9:14 AM

To: romero.mike@deq.state.or.us

Subject: FW: Portland dirt removal - Lubes piping in Tank Farm 3

Importance: High

Mike,

I have been informed by our Transportation group that they'll be daylighting some piping within the tank farm at our Portland terminal for some inspections. As you can see from the attached photos, a small portion of the piping is covered by fill dirt. Would removal of this soil fall under the Soil Management Plan being that it is not really representative of subsurface soil? The work is scheduled to be conducted within the next week or two.

Thanks in advance for your guidance.

Best Regards,  
Eric

Eric G. Hetrick

Site Manager - Risk Management and Remediation

ConocoPhillips Company

76 Broadway

Sacramento, CA 95818

**COP0020269**

916-558-7604 (office)

916-307-3450 (cell)

916-558-7639 (fax)

Eric.G.Hetrick@conocophillips.com

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- There is zero tolerance for willful unsafe actions.
- Stop all unsafe work.

Val, we are looking at removing the dirt you see pictured that is piled up against dike wall in Tank Farm 3. We would only be removing the dirt piled on top of surface not surface itself. What exactly do we need to do in order to meet regs as far as testing and removal?

This will enable us to inspect piping which is currently buried.

Gary

---

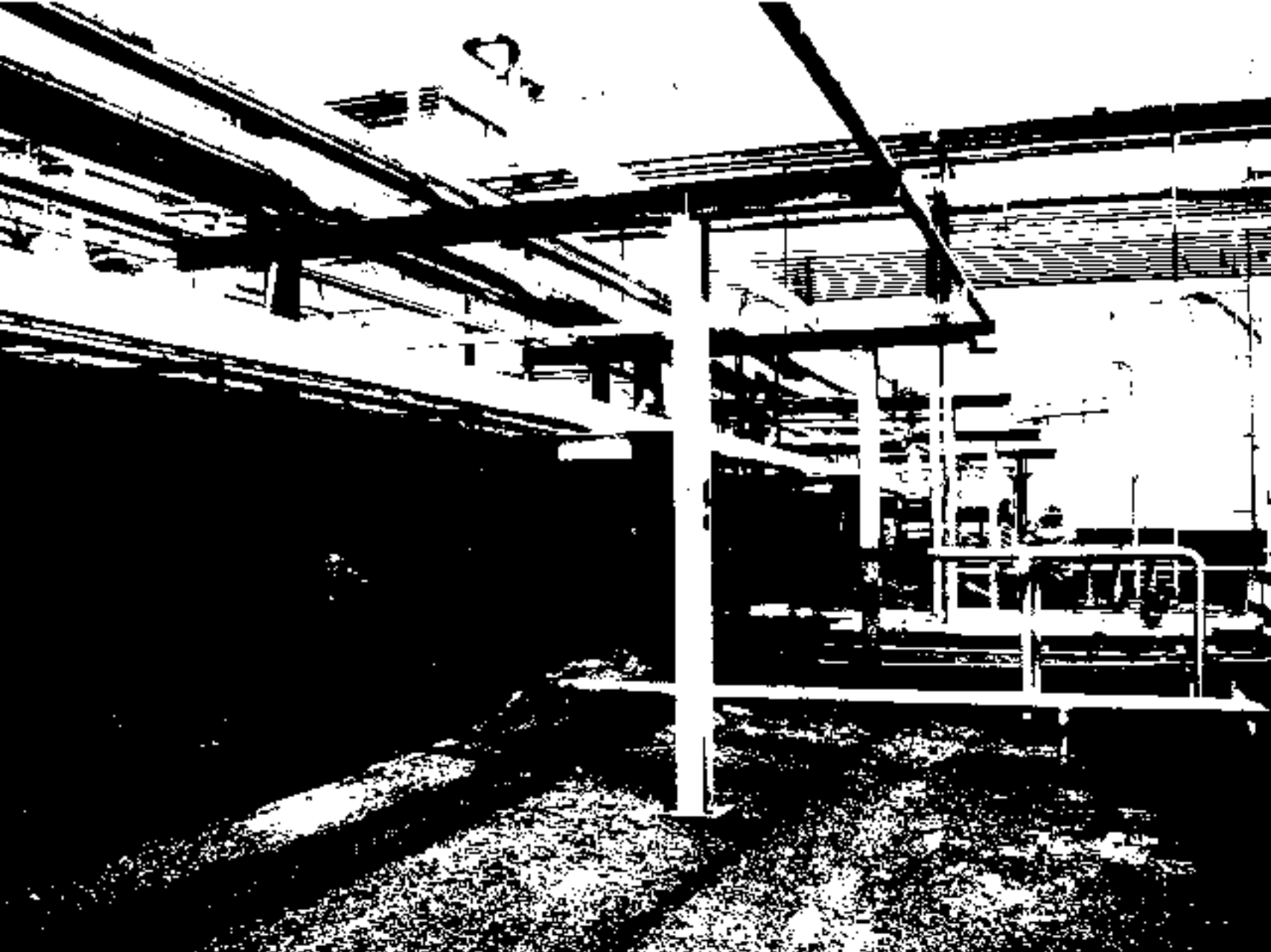
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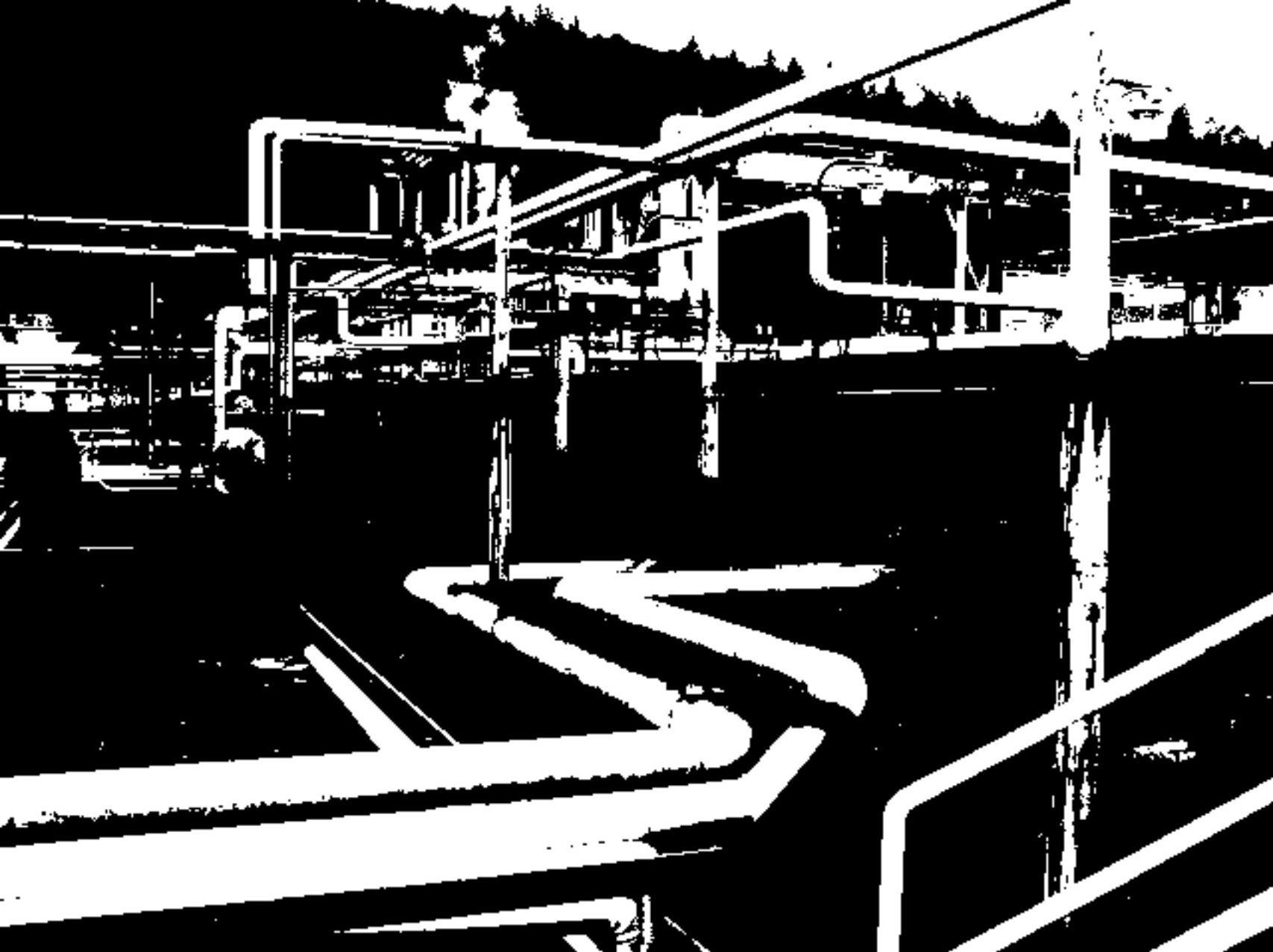
Sent: Wednesday, June 15, 2011 9:38 AM

To: Lefebvre, Gary:

Subject: Project pix

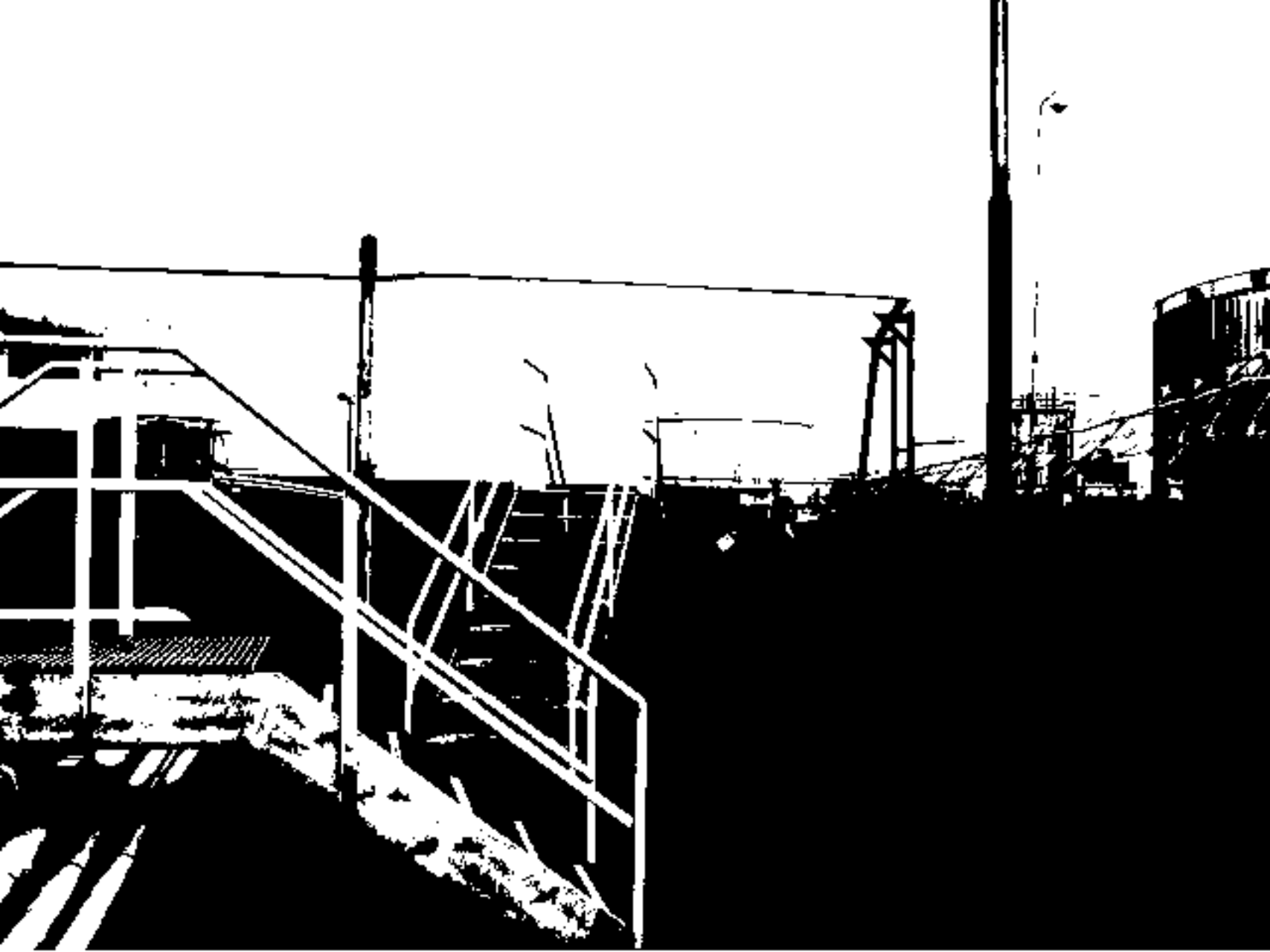
**COP0020270**





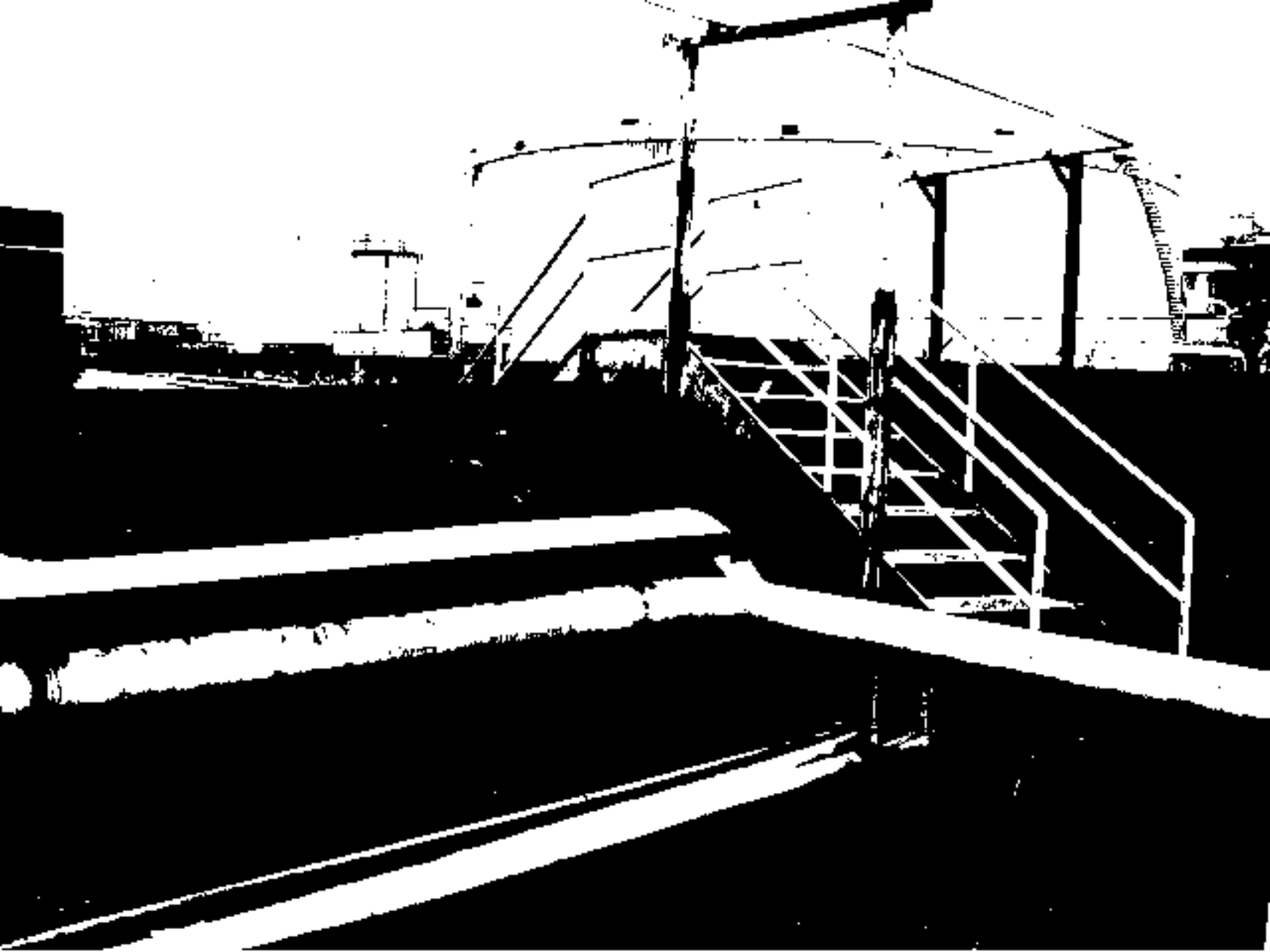


COP0020273

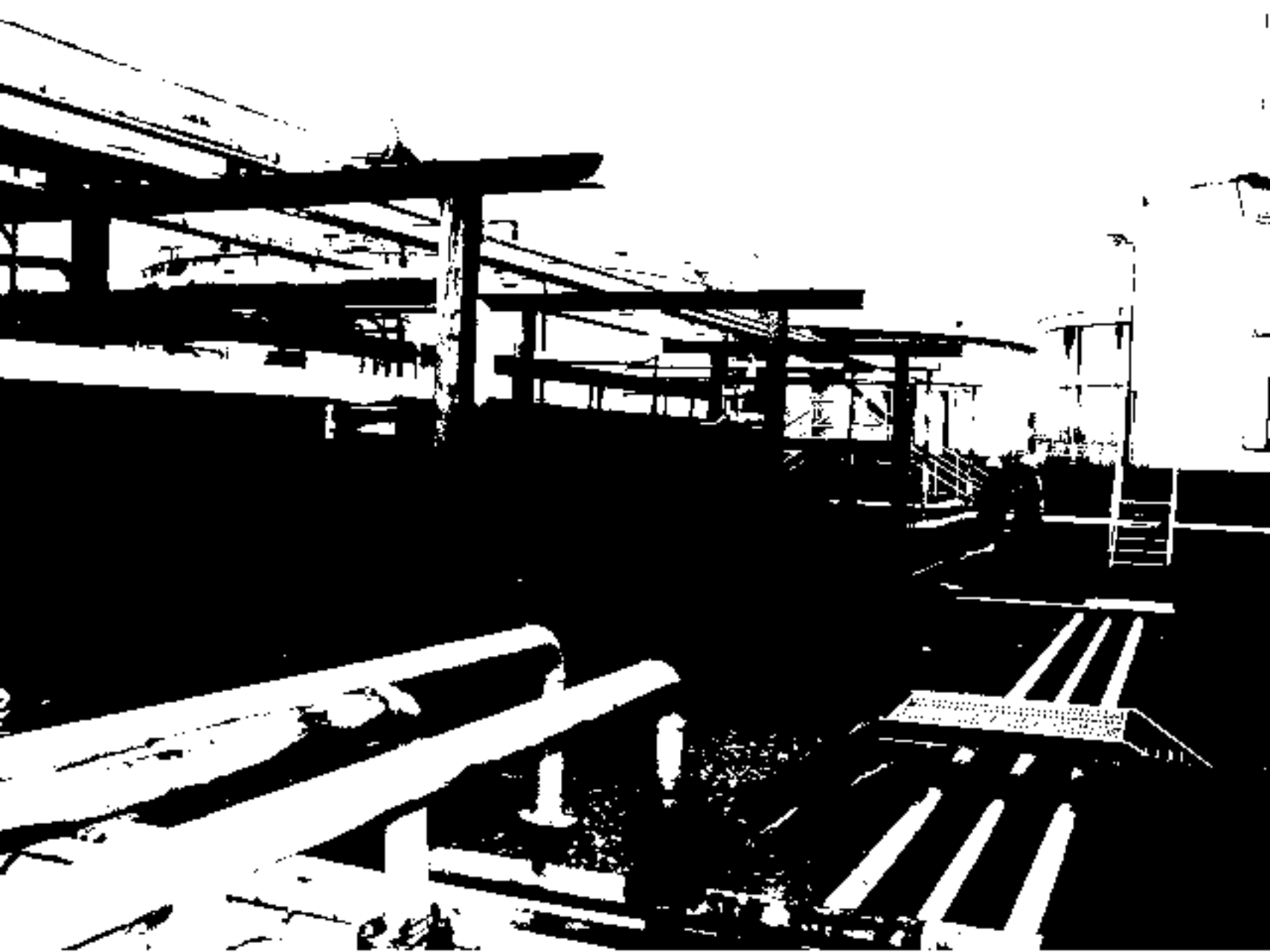


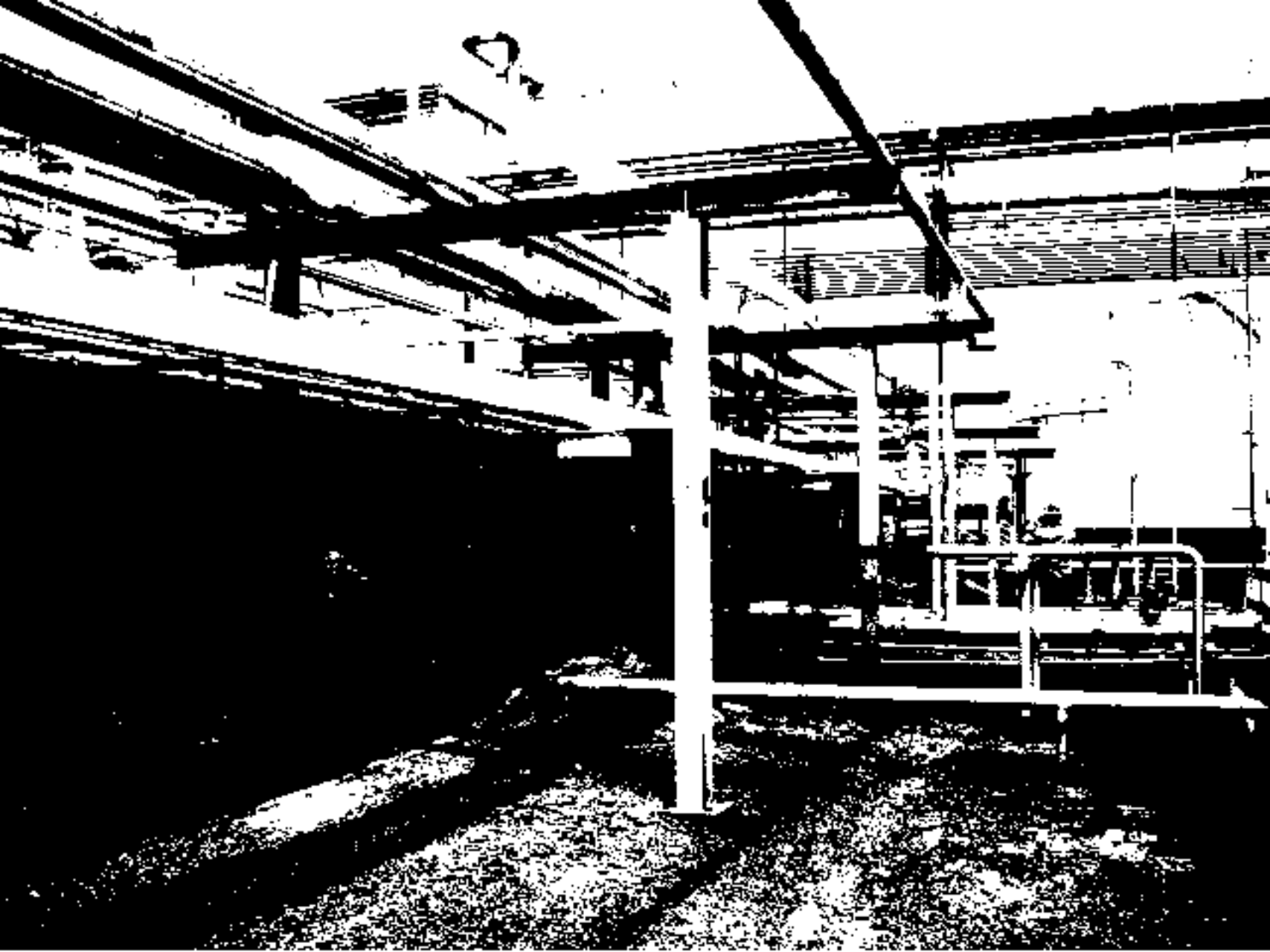
COP0020274

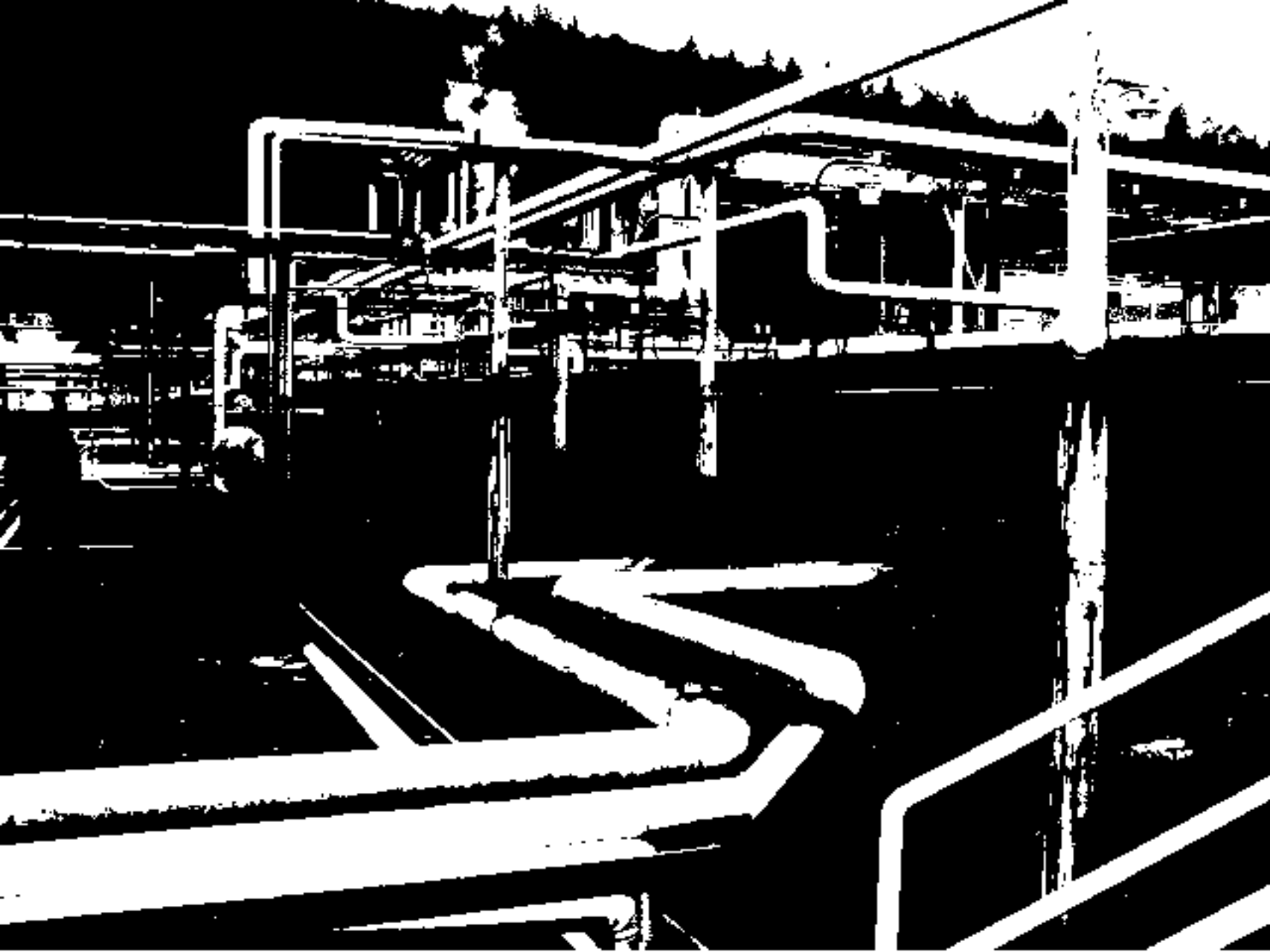




COP0020275



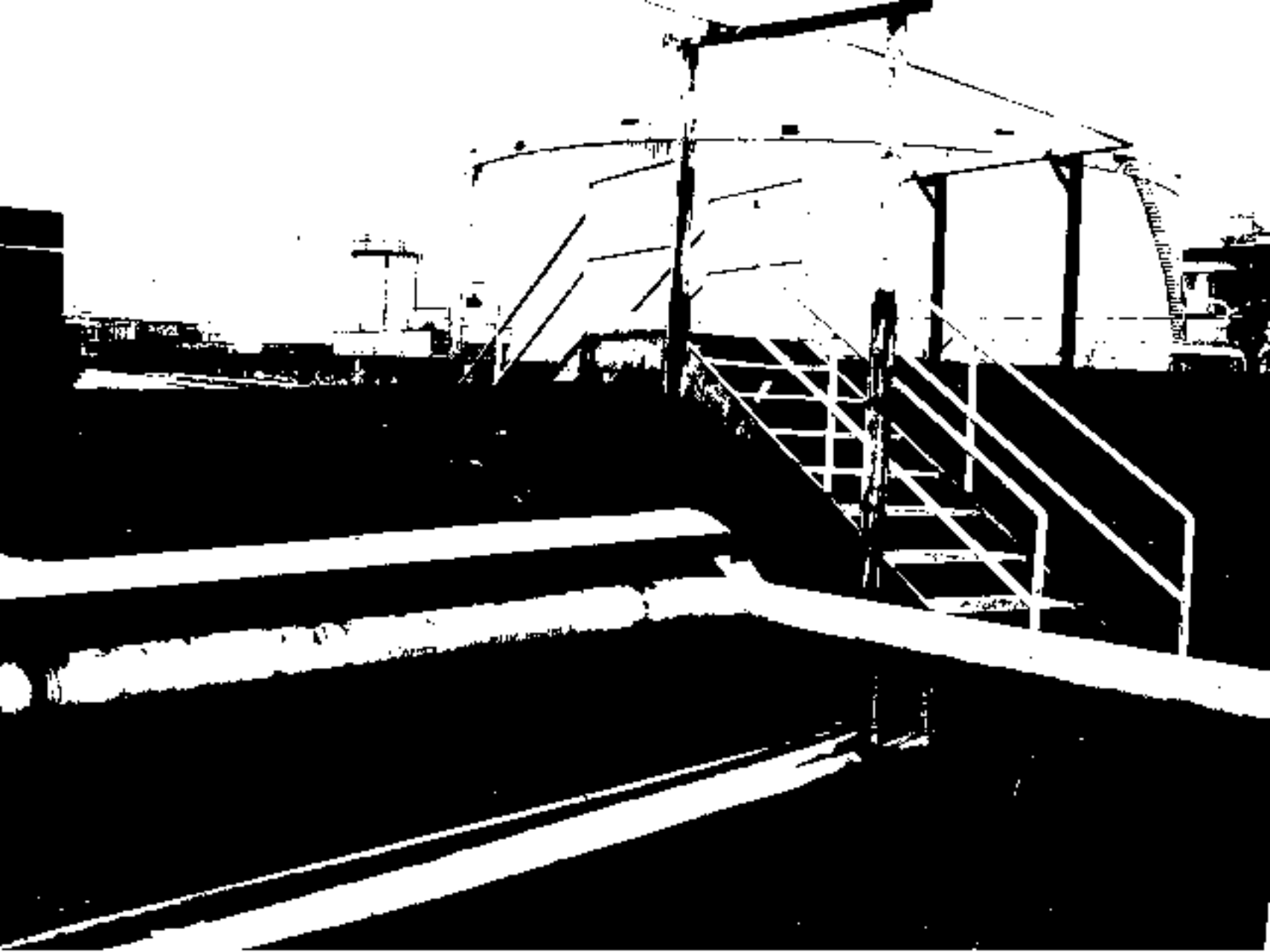




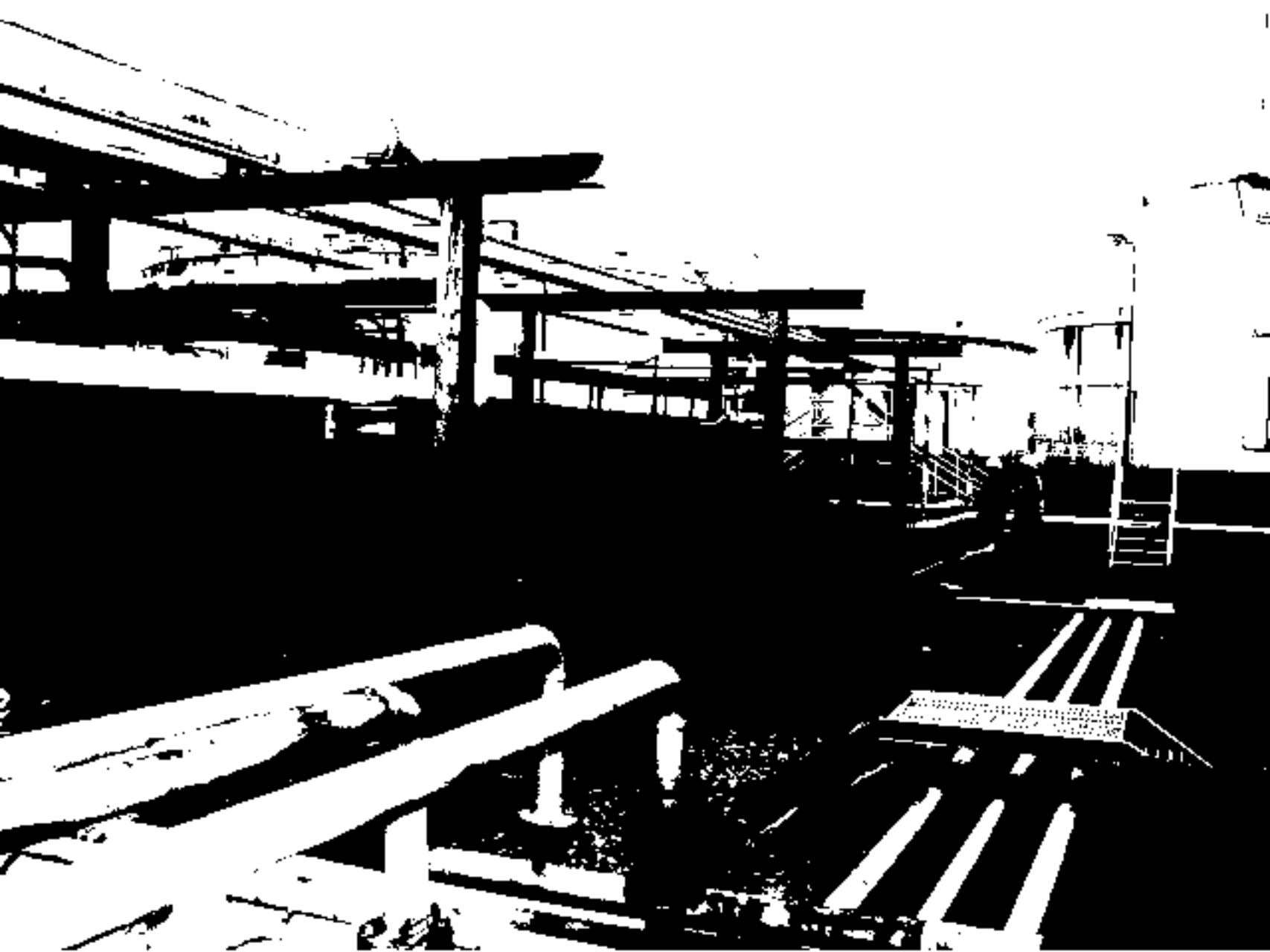


COP0020279





COP0020281





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**From:** Hetrick, Eric G  
**Sent:** Thursday, July 28, 2011 05:53 PM  
**To:** romero.mike@deq.state.or.us; thiessen.kenneth@deq.state.or.us  
**CC:** Trewartha, Mark; Carlton-Franco, Chris; Uyeda, Valerie J  
**Subject:** FW: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Mike/Ken,

FYI, I wanted to provide you with notification that our Transportation group will be disturbing some soil in TF #3 to a depth of approximately three feet to expose some pipe supports. We'll provide you with an update to let you know if we encounter any impacts.

Regards,  
Eric

Eric G. Hetrick  
Site Manager - Risk Management and Remediation  
ConocoPhillips Company  
76 Broadway  
Sacramento, CA 95818  
916-558-7604 (office)  
916-307-3450 (cell)  
916-558-7639 (fax)  
Eric.G.Hetrick@conocophillips.com

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- Stop all unsafe work.

---

From: Uyeda, Valerie J  
Sent: Thursday, July 28, 2011 9:43 AM  
To: Hetrick, Eric G  
Cc: Edwards, Scott S  
Subject: FW: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Eric:

Please inform DEQ that we will be doing exploratory digging in Tank Farm 3 at Portland Terminal.  
Thanks.

-Val -

---

From: Scott White [mailto:SWhite@BRINDERSON.com]  
Sent: Thursday, July 28, 2011 9:00 AM  
To: Uyeda, Valerie J  
Cc: Edwards, Scott S  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Thanks Val,

We are just exposing 3 pipe support foundations to verify what kind of underground supports they are, Take photos, and cover them back up.

**COP0020283**

Thanks

Scott White

Pacific Northwest Superintendent

(714) 318-4533

swhite@brinderson.com

BRINDERSON

---

From: Mike Webber [mailto:mikwebber@comcast.net]  
Sent: Wednesday, July 27, 2011 9:30 AM  
To: Uyeda, Valerie J  
Cc: 'Scott White'  
Subject: FW: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Hi Val,

Hope you are doing well.

Has anyone requested you to make notification for this exploratory digging in Tank Farm 3 in Portland? If so, what is the status of that request.

The Brinderson crew will be available to do this work sometime next week.

Thanks,

Mike

Mike Webber, CFR

423-505-6897

mikwebber@comcast.net

From: Scott White [mailto:SWhite@BRINDERSON.com]  
Sent: Tuesday, July 12, 2011 2:09 PM  
To: Bill Clements; Jason LaBoa  
Cc: Mike Webber; Jeff Taylor; Edwards, Scott S; Tom Guzman  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

**COP0020284**

Bill,

Thanks for the info. I have forwarded this information over to my GF and as soon as the CFR on site has the approval from Valery's department, (EPA) we start the dig and will get you the information. This should not take but a day to do.

Regards

Scott White

Pacific Northwest Superintendent

(714) 318-4533

swhite@brinderson.com

BRINDERSON

From: Bill Clements

Sent: Tuesday, July 12, 2011 1:50 PM

To: Scott White

Cc: Mike Webber; Jeff Taylor; 'Edwards, Scott S'

Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Scott, I would like to determine what type of foundation exists at each of the identified locations. For instance at the existing pipe support bents next to the retaining wall dig down until you expose the corners of the spread footing, and then dig down on one edge to find out how thick the footing is. It would be nice also to take pictures before you backfill the excavation. I suspect that at the tall pipe

support PS-A there is a drilled pier foundation. Dig down about 3 ft on one side and if you do not hit a footing I can assume a drilled pier. If you have any questions please give me a call.

Thanks,

Bill Clements

Civil/Structural Department Manager

Brinderson

D 714.466.7262

F 713.466.7320

M 714.348.3413

bclements@brinderson.com

www.brinderson.com

From: Edwards, Scott S [mailto:H.Scott.Edwards@conocophillips.com]

Sent: Tuesday, July 12, 2011 1:27 PM

To: Bill Clements

Cc: Mike Webber; Scott White; Jeff Taylor

**COP0020285**

Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Bill can you please provide some guidance on what you're interested in for the Portland excavations?  
Thanks,

SCott

---

From: Scott White [mailto:SWhite@BRINDERSON.com]  
Sent: Tuesday, July 12, 2011 12:35 PM  
To: Edwards, Scott S; Jeff Taylor  
Cc: Bill Clements; Mike Webber  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Scott,

Thanks for the PO. As soon as we get clearance from our CFR to dig, we can start the excavation.  
Once we expose the existing foundations, what would you like us to do? Take photos and then cover back up?

Thanks

Scott White

Pacific Northwest Superintendent

(714) 318-4533

swhite@brinderson.com

BRINDERSON

From: Edwards, Scott S [mailto:H.Scott.Edwards@conocophillips.com]  
Sent: Wednesday, July 06, 2011 3:44 PM  
To: Jeff Taylor  
Cc: Bill Clements; Scott White  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Jeff, the new rack supports PS-101 & PS-102 will need to be designed to accept the larger loads as are typical of the pipe racks further south of this run.

On the pipe supports where the pipe turns east into SK-207, the modified pipe supports will need to be designed to carry the new 16" pipe load, along with an allowance for a future 10" pipe load (this is in case we wish to replace the buried 10" line to the truck rack with above-ground piping).

The plans to excavate the soil from behind the east side of the existing concrete retaining wall don't reach PS-102 (all the excavation will take place south of PS-102), so the grade elevations at the east and west foundations at PS-102 will be what Bill saw.

Thanks,

**COP0020286**

Scott

---

From: Jeff Taylor [mailto:JTaylor@BRINDERSON.com]  
Sent: Tuesday, July 05, 2011 4:10 PM  
To: Edwards, Scott S  
Cc: Bill Clements; Scott White  
Subject: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Scott E: In developing the pipe supports for the new 16" diesel line at Portland, Bill Clements would like to confirm several details of allowable loads on the pipe supports entering into Tank Farm 3. Referring to Bill's sketch SK-205 he emailed last week, please confirm that the two new pipe rack supports, PS-101 & 102, will be designed to accept typically larger loads of the pipe racks down the balance of this run. Where the pipe turns between the tanks into Bill's Sk-207, also confirm that these modified pipe supports will only be designed to carry the new 16" pipe loads, with no allowance for future additions.

Additionally, looking back at SK-205, Bill noted that plans were under way to excavate the soil from behind the east side of the existing concrete retaining wall. How will the grade change working south along the wall starting from the north east corner? Will the grade elevations at the east and west foundations at PS-102 be different?

Don't hesitate to contact Bill if any discussion are warranted before responding to this inquiry.

Regards,

Jeff Taylor

Project Manager

BRINDERSON ENGINEERS & CONSTRUCTORS

3330 Harbor Blvd, Costa Mesa, CA 92626

Direct 714.466.7289 Cell 949.463.2469

**COP0020287**

---

**From:** THIESSEN Kenneth  
**Sent:** Thursday, July 28, 2011 06:19 PM  
**To:** Hetrick, Eric G; ROMERO Mike  
**CC:** Trewartha, Mark; Carlton-Franco, Chris; Uyeda, Valerie J  
**Subject:** RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Eric,

Thank you for this notification. If contaminated soil is encountered in these small excavations, please handle in accordance with the Contaminated Media Management Plan in effect for the site.

If heavy staining or free product are observed in the excavations, please notify DEQ immediately.

Sincerely,

Kenneth Thiessen

Certified Engineering Geologist

Oregon Dept. of Environmental Quality

NW Region Cleanup Program

2020 SW 4th Ave, Ste, 400

Portland, OR 97201

(503) 229-6015

From: Hetrick, Eric G [mailto:Eric.G.Hetrick@conocophillips.com]  
Sent: Thursday, July 28, 2011 10:53 AM  
To: ROMERO Mike; THIESSEN Kenneth  
Cc: Trewartha, Mark; Carlton-Franco, Chris; Uyeda, Valerie J  
Subject: FW: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Mike/Ken,

FYI, I wanted to provide you with notification that our Transportation group will be disturbing some soil in TF #3 to a depth of approximately three feet to expose some pipe supports. We'll provide you with an update to let you know if we encounter any impacts.

Regards,  
Eric

Eric G. Hetrick  
Site Manager - Risk Management and Remediation  
ConocoPhillips Company  
76 Broadway  
Sacramento, CA 95818  
916-558-7604 (office)  
916-307-3450 (cell)  
916-558-7639 (fax)  
Eric.G.Hetrick@conocophillips.com

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- Stop all unsafe work.

---

From: Uyeda, Valerie J  
Sent: Thursday, July 28, 2011 9:43 AM  
To: Hetrick, Eric G  
Cc: Edwards, Scott S  
Subject: FW: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Eric:

Please inform DEQ that we will be doing exploratory digging in Tank Farm 3 at Portland Terminal.  
Thanks.

-Val -

---

From: Scott White [mailto:SWhite@BRINDERSON.com]  
Sent: Thursday, July 28, 2011 9:00 AM  
To: Uyeda, Valerie J  
Cc: Edwards, Scott S  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Thanks Val,

We are just exposing 3 pipe support foundations to verify what kind of underground supports they are, Take photos, and cover them back up.

Thanks

Scott White

Pacific Northwest Superintendent

(714) 318-4533

swhite@brinderson.com

BRINDERSON

---

From: Mike Webber [mailto:mikwebber@comcast.net]  
Sent: Wednesday, July 27, 2011 9:30 AM  
To: Uyeda, Valerie J  
Cc: 'Scott White'  
Subject: FW: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

**COP0020289**

Hi Val,

Hope you are doing well.

Has anyone requested you to make notification for this exploratory digging in Tank Farm 3 in Portland? If so, what is the status of that request.

The Brinderson crew will be available to do this work sometime next week.

Thanks,

Mike

Mike Webber, CFR

423-505-6897

mikwebber@comcast.net

From: Scott White [mailto:SWhite@BRINDERSON.com]

Sent: Tuesday, July 12, 2011 2:09 PM

To: Bill Clements; Jason LaBoa

Cc: Mike Webber; Jeff Taylor; Edwards, Scott S; Tom Guzman

Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Bill,

Thanks for the info. I have forwarded this information over to my GF and as soon as the CFR on site has the approval from Valery's department, (EPA) we start the dig and will get you the information. This should not take but a day to do.

Regards

Scott White

Pacific Northwest Superintendent

(714) 318-4533

swhite@brinderson.com

BRINDERSON

From: Bill Clements

**COP0020290**



Sent: Tuesday, July 12, 2011 1:50 PM  
To: Scott White  
Cc: Mike Webber; Jeff Taylor; 'Edwards, Scott S'  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Scott, I would like to determine what type of foundation exists at each of the identified locations. For instance at the existing pipe support bents next to the retaining wall dig down until you expose the corners of the spread footing, and then dig down on one edge to find out how thick the footing is. It would be nice also to take pictures before you backfill the excavation. I suspect that at the tall pipe

support PS-A there is a drilled pier foundation. Dig down about 3 ft on one side and if you do not hit a footing I can assume a drilled pier. If you have any questions please give me a call.

Thanks,

Bill Clements

Civil/Structural Department Manager

Brinderson

D 714.466.7262

F 713.466.7320

M 714.348.3413

bclements@brinderson.com

www.brinderson.com

From: Edwards, Scott S [mailto:H.Scott.Edwards@conocophillips.com]  
Sent: Tuesday, July 12, 2011 1:27 PM  
To: Bill Clements  
Cc: Mike Webber; Scott White; Jeff Taylor  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Bill can you please provide some guidance on what you're interested in for the Portland excavations?  
Thanks,

SCott

---

From: Scott White [mailto:SWhite@BRINDERSON.com]  
Sent: Tuesday, July 12, 2011 12:35 PM  
To: Edwards, Scott S; Jeff Taylor  
Cc: Bill Clements; Mike Webber  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Scott,

Thanks for the PO. As soon as we get clearance from our CFR to dig, we can start the excavation. Once we expose the existing foundations, what would you like us to do? Take photos and then cover

**COP0020291**

back up?

Thanks

Scott White

Pacific Northwest Superintendent

(714) 318-4533

swhite@brinderson.com

BRINDERSON

From: Edwards, Scott S [mailto:H.Scott.Edwards@conocophillips.com]  
Sent: Wednesday, July 06, 2011 3:44 PM  
To: Jeff Taylor  
Cc: Bill Clements; Scott White  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Jeff, the new rack supports PS-101 & PS-102 will need to be designed to accept the larger loads as are typical of the pipe racks further south of this run.

On the pipe supports where the pipe turns east into SK-207, the modified pipe supports will need to be designed to carry the new 16" pipe load, along with an allowance for a future 10" pipe load (this is in case we wish to replace the buried 10" line to the truck rack with above-ground piping).

The plans to excavate the soil from behind the east side of the existing concrete retaining wall don't reach PS-102 (all the excavation will take place south of PS-102), so the grade elevations at the east and west foundations at PS-102 will be what Bill saw.

Thanks,

Scott

---

From: Jeff Taylor [mailto:JTaylor@BRINDERSON.com]  
Sent: Tuesday, July 05, 2011 4:10 PM  
To: Edwards, Scott S  
Cc: Bill Clements; Scott White  
Subject: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Scott E: In developing the pipe supports for the new 16" diesel line at Portland, Bill Clements would like to confirm several details of allowable loads on the pipe supports entering into Tank Farm 3. Referring to Bill's sketch SK-205 he emailed last week, please confirm that the two new pipe rack supports, PS-101 & 102, will be designed to accept typically larger loads of the pipe racks down the balance of this run. Where the pipe turns between the tanks into Bill's Sk-207, also confirm that these modified pipe supports will only be designed to carry the new 16" pipe loads, with no allowance for future additions.

**COP0020292**

Additionally, looking back at SK-205, Bill noted that plans were under way to excavate the soil from behind the east side of the existing concrete retaining wall. How will the grade change working south along the wall starting from the north east corner? Will the grade elevations at the east and west foundations at PS-102 be different?

Don't hesitate to contact Bill if any discussion are warranted before responding to this inquiry.

Regards,

Jeff Taylor

Project Manager

BRINDERSON ENGINEERS & CONSTRUCTORS

3330 Harbor Blvd, Costa Mesa, CA 92626

Direct 714.466.7289 Cell 949.463.2469

---

**From:** Uyeda, Valerie J  
**Sent:** Thursday, July 28, 2011 05:54 PM  
**To:** Edwards, Scott S  
**CC:** Lyons, Thomas; Mike Webber; 'Scott White'; Hetrick, Eric G  
**Subject:** RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Scott Edwards et al:

DEQ will be provided 5 days notice today that we will be digging in Tank Farm 3. Digging may begin after Tuesday, 8/2.

The soil that you dig out CANNOT be put immediately back into the ground at Portland because we are under a clean-up plan with the Oregon Dept of Environmental Quality and EPA. We have two options:

1. Have clean back fill ready to use
2. Leave the holes in place while the soil is tested for contamination.

This will require that the soil be placed on 8-mil or thicker plastic, such as visqueen, and the piles be kept covered.

If the soil is deemed to be acceptable to be reused (after receiving the analytical results back), we can put back in the hole.

If the soil is not acceptable, then we will have to send for disposal. If you the soil is not visibly stained and there is not a noticeable odor, we have a better chance of it being acceptable for reuse but must test for contamination, regardless.

Please let me know how you plan to proceed. If you think you want to reuse the soil, then I will work with Eric Hetrick, RMR, to have a contractor available to take samples upon digging.

- Val -

---

From: Mike Webber [mailto:mikwebber@comcast.net]  
Sent: Thursday, July 28, 2011 9:12 AM  
To: 'Scott White'  
Cc: Uyeda, Valerie J  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Scott,

Can you provide Val with this information?

Thanks,

Mike W

From: Uyeda, Valerie J [mailto:Valerie.J.Uyeda@conocophillips.com]  
Sent: Thursday, July 28, 2011 8:42 AM  
To: Mike Webber  
Cc: 'Scott White'  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

**COP0020294**

I have not received any requests. We need to provide DEQ with 5 days notification prior to digging. What exactly are you doing? I'll be on vacation next week.

---

From: Mike Webber [mailto:mikwebber@comcast.net]  
Sent: Wednesday, July 27, 2011 9:30 AM  
To: Uyeda, Valerie J  
Cc: 'Scott White'  
Subject: FW: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Hi Val,

Hope you are doing well.

Has anyone requested you to make notification for this exploratory digging in Tank Farm 3 in Portland? If so, what is the status of that request.

The Brinderson crew will be available to do this work sometime next week.

Thanks,

Mike

Mike Webber, CFR

423-505-6897

mikwebber@comcast.net

From: Scott White [mailto:SWhite@BRINDERSON.com]  
Sent: Tuesday, July 12, 2011 2:09 PM  
To: Bill Clements; Jason LaBoa  
Cc: Mike Webber; Jeff Taylor; Edwards, Scott S; Tom Guzman  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Bill,

Thanks for the info. I have forwarded this information over to my GF and as soon as the CFR on site has the approval from Valery's department, (EPA) we start the dig and will get you the information. This should not take but a day to do.

Regards

Scott White

**COP0020295**

Pacific Northwest Superintendent

(714) 318-4533

swhite@brinderson.com

BRINDERSON

From: Bill Clements

Sent: Tuesday, July 12, 2011 1:50 PM

To: Scott White

Cc: Mike Webber; Jeff Taylor; 'Edwards, Scott S'

Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Scott, I would like to determine what type of foundation exists at each of the identified locations. For instance at the existing pipe support bents next to the retaining wall dig down until you expose the corners of the spread footing, and then dig down on one edge to find out how thick the footing is. It would be nice also to take pictures before you backfill the excavation. I suspect that at the tall pipe

support PS-A there is a drilled pier foundation. Dig down about 3 ft on one side and if you do not hit a footing I can assume a drilled pier. If you have any questions please give me a call.

Thanks,

Bill Clements

Civil/Structural Department Manager

Brinderson

D 714.466.7262

F 713.466.7320

M 714.348.3413

bclements@brinderson.com

www.brinderson.com

From: Edwards, Scott S [mailto:H.Scott.Edwards@conocophillips.com]

Sent: Tuesday, July 12, 2011 1:27 PM

To: Bill Clements

Cc: Mike Webber; Scott White; Jeff Taylor

Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Bill can you please provide some guidance on what you're interested in for the Portland excavations?  
Thanks,

SCott

**COP0020296**

---

From: Scott White [mailto:SWhite@BRINDERSON.com]  
Sent: Tuesday, July 12, 2011 12:35 PM  
To: Edwards, Scott S; Jeff Taylor  
Cc: Bill Clements; Mike Webber  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Scott,

Thanks for the PO. As soon as we get clearance from our CFR to dig, we can start the excavation. Once we expose the existing foundations, what would you like us to do? Take photos and then cover back up?

Thanks

Scott White

Pacific Northwest Superintendent

(714) 318-4533

swhite@brinderson.com

BRINDERSON

From: Edwards, Scott S [mailto:H.Scott.Edwards@conocophillips.com]  
Sent: Wednesday, July 06, 2011 3:44 PM  
To: Jeff Taylor  
Cc: Bill Clements; Scott White  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Jeff, the new rack supports PS-101 & PS-102 will need to be designed to accept the larger loads as are typical of the pipe racks further south of this run.

On the pipe supports where the pipe turns east into SK-207, the modified pipe supports will need to be designed to carry the new 16" pipe load, along with an allowance for a future 10" pipe load (this is in case we wish to replace the buried 10" line to the truck rack with above-ground piping).

The plans to excavate the soil from behind the east side of the existing concrete retaining wall don't reach PS-102 (all the excavation will take place south of PS-102), so the grade elevations at the east and west foundations at PS-102 will be what Bill saw.

Thanks,

Scott

---

From: Jeff Taylor [mailto:JTaylor@BRINDERSON.com]  
Sent: Tuesday, July 05, 2011 4:10 PM

**COP0020297**

To: Edwards, Scott S  
Cc: Bill Clements; Scott White  
Subject: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Scott E: In developing the pipe supports for the new 16" diesel line at Portland, Bill Clements would like to confirm several details of allowable loads on the pipe supports entering into Tank Farm 3. Referring to Bill's sketch SK-205 he emailed last week, please confirm that the two new pipe rack supports, PS-101 & 102, will be designed to accept typically larger loads of the pipe racks down the balance of this run. Where the pipe turns between the tanks into Bill's Sk-207, also confirm that these modified pipe supports will only be designed to carry the new 16" pipe loads, with no allowance for future additions.

Additionally, looking back at SK-205, Bill noted that plans were under way to excavate the soil from behind the east side of the existing concrete retaining wall. How will the grade change working south along the wall starting from the north east corner? Will the grade elevations at the east and west foundations at PS-102 be different?

Don't hesitate to contact Bill if any discussion are warranted before responding to this inquiry.

Regards,

Jeff Taylor

Project Manager

BRINDERSON ENGINEERS & CONSTRUCTORS

3330 Harbor Blvd, Costa Mesa, CA 92626

Direct 714.466.7289 Cell 949.463.2469

**COP0020298**



---

**From:** Trewartha, Mark  
**Sent:** Monday, August 01, 2011 06:37 PM  
**To:** romero.mike@deq.state.or.us; thiessen.kenneth@deq.state.or.us  
**CC:** Uyeda, Valerie J; Gdak, Chris; Sauze, Marc; Hetrick, Eric G  
**Subject:** RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Ken and Mike,

Mike Webber at the COP terminal has informed us that the proposed digging Eric Hetrick notified DEQ of last week (see below) will begin Wednesday morning (8/3/11). The proposed digging will consist of up to three excavation locations within ~50 feet of each other to expose the footers for a pipe rack in Tank Farm 3 - maximum depth will probably be less than 5 feet bgs.

Stantec is scheduled to arrive at the terminal mid-morning and meet up with him to document the activities and field screen excavated soil and the excavation itself.

Let me know if you have any questions.

Mark Trewartha, RG  
Senior Hydrogeologist  
Stantec

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
Fx: (503) 297-5429  
Cell: (503) 807-8568  
mark.trewartha@stantec.com

stantec.com <<http://www.stantec.com>>

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ü Please consider the environment before printing this email.

From: Hetrick, Eric G [mailto:Eric.G.Hetrick@conocophillips.com]  
Sent: Thursday, July 28, 2011 10:53 AM  
To: romero.mike@deq.state.or.us; thiessen.kenneth@deq.state.or.us  
Cc: Trewartha, Mark; Carlton-Franco, Chris; Uyeda, Valerie J  
Subject: FW: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Mike/Ken,

FYI, I wanted to provide you with notification that our Transportation group will be disturbing some soil in TF #3 to a depth of approximately three feet to expose some pipe supports. We'll provide you with an update to let you know if we encounter any impacts.

**COP0020299**

Regards,  
Eric

Eric G. Hetrick  
Site Manager - Risk Management and Remediation  
ConocoPhillips Company  
76 Broadway  
Sacramento, CA 95818  
916-558-7604 (office)  
916-307-3450 (cell)  
916-558-7639 (fax)  
Eric.G.Hetrick@conocophillips.com <mailto:Eric.G.Hetrick@conocophillips.com>

RM&R Safety Principles:

- Report to work physically rested and mentally alert.
- Observe and coach your co-workers to ensure that they work safely.
- Do not improvise or take short cuts - follow procedures.
- There is zero tolerance for willful unsafe actions.
- Stop all unsafe work.

---

From: Uyeda, Valerie J  
Sent: Thursday, July 28, 2011 9:43 AM  
To: Hetrick, Eric G  
Cc: Edwards, Scott S  
Subject: FW: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Eric:

Please inform DEQ that we will be doing exploratory digging in Tank Farm 3 at Portland Terminal.  
Thanks.

-Val -

---

From: Scott White [mailto:SWhite@BRINDERSON.com]  
Sent: Thursday, July 28, 2011 9:00 AM  
To: Uyeda, Valerie J  
Cc: Edwards, Scott S  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Thanks Val,

We are just exposing 3 pipe support foundations to verify what kind of underground supports they are, Take photos, and cover them back up.

Thanks

Scott White

Pacific Northwest Superintendent

(714) 318-4533

swhite@brinderson.com <mailto:swhite@brinderson.com>

**COP0020300**

BRINDERSON

---

From: Mike Webber [mailto:mikwebber@comcast.net]  
Sent: Wednesday, July 27, 2011 9:30 AM  
To: Uyeda, Valerie J  
Cc: 'Scott White'  
Subject: FW: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Hi Val,

Hope you are doing well.

Has anyone requested you to make notification for this exploratory digging in Tank Farm 3 in Portland? If so, what is the status of that request.

The Brinderson crew will be available to do this work sometime next week.

Thanks,

Mike

Mike Webber, CFR

423-505-6897

mikwebber@comcast.net <mailto:mikwebber@comcast.net>

From: Scott White [mailto:SWhite@BRINDERSON.com]  
Sent: Tuesday, July 12, 2011 2:09 PM  
To: Bill Clements; Jason LaBoa  
Cc: Mike Webber; Jeff Taylor; Edwards, Scott S; Tom Guzman  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Bill,

Thanks for the info. I have forwarded this information over to my GF and as soon as the CFR on site has the approval from Valery's department, (EPA) we start the dig and will get you the information. This should not take but a day to do.

Regards

Scott White

**COP0020301**

Pacific Northwest Superintendent

(714) 318-4533

swhite@brinderson.com <mailto:swhite@brinderson.com>

BRINDERSON

From: Bill Clements

Sent: Tuesday, July 12, 2011 1:50 PM

To: Scott White

Cc: Mike Webber; Jeff Taylor; 'Edwards, Scott S'

Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Scott, I would like to determine what type of foundation exists at each of the identified locations. For instance at the existing pipe support bents next to the retaining wall dig down until you expose the corners of the spread footing, and then dig down on one edge to find out how thick the footing is. It would be nice also to take pictures before you backfill the excavation. I suspect that at the tall pipe

support PS-A there is a drilled pier foundation. Dig down about 3 ft on one side and if you do not hit a footing I can assume a drilled pier. If you have any questions please give me a call.

Thanks,

Bill Clements

Civil/Structural Department Manager

Brinderson

D 714.466.7262

F 713.466.7320

M 714.348.3413

bclements@brinderson.com <mailto:bclements@brinderson.com>

www.brinderson.com <http://www.brinderson.com>

From: Edwards, Scott S [mailto:H.Scott.Edwards@conocophillips.com]

Sent: Tuesday, July 12, 2011 1:27 PM

To: Bill Clements

Cc: Mike Webber; Scott White; Jeff Taylor

Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Bill can you please provide some guidance on what you're interested in for the Portland excavations?  
Thanks,

SCott

**COP0020302**

---

From: Scott White [mailto:SWhite@BRINDERSON.com]  
Sent: Tuesday, July 12, 2011 12:35 PM  
To: Edwards, Scott S; Jeff Taylor  
Cc: Bill Clements; Mike Webber  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Scott,

Thanks for the PO. As soon as we get clearance from our CFR to dig, we can start the excavation. Once we expose the existing foundations, what would you like us to do? Take photos and then cover back up?

Thanks

Scott White

Pacific Northwest Superintendent

(714) 318-4533

swhite@brinderson.com <mailto:swhite@brinderson.com>

BRINDERSON

From: Edwards, Scott S [mailto:H.Scott.Edwards@conocophillips.com]  
Sent: Wednesday, July 06, 2011 3:44 PM  
To: Jeff Taylor  
Cc: Bill Clements; Scott White  
Subject: RE: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Jeff, the new rack supports PS-101 & PS-102 will need to be designed to accept the larger loads as are typical of the pipe racks further south of this run.

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The plans to excavate the soil from behind the east side of the existing concrete retaining wall don't reach PS-102 (all the excavation will take place south of PS-102), so the grade elevations at the east and west foundations at PS-102 will be what Bill saw.

Thanks,

Scott

---

From: Jeff Taylor [mailto:JTaylor@BRINDERSON.com]  
Sent: Tuesday, July 05, 2011 4:10 PM

**COP0020303**

To: Edwards, Scott S  
Cc: Bill Clements; Scott White  
Subject: E6691N214 Portland Diesel Debottlenecking - Tank Farm 3 Pipe Supports - Target Loads

Scott E: In developing the pipe supports for the new 16" diesel line at Portland, Bill Clements would like to confirm several details of allowable loads on the pipe supports entering into Tank Farm 3. Referring to Bill's sketch SK-205 he emailed last week, please confirm that the two new pipe rack supports, PS-101 & 102, will be designed to accept typically larger loads of the pipe racks down the balance of this run. Where the pipe turns between the tanks into Bill's Sk-207, also confirm that these modified pipe supports will only be designed to carry the new 16" pipe loads, with no allowance for future additions.

Additionally, looking back at SK-205, Bill noted that plans were under way to excavate the soil from behind the east side of the existing concrete retaining wall. How will the grade change working south along the wall starting from the north east corner? Will the grade elevations at the east and west foundations at PS-102 be different?

Don't hesitate to contact Bill if any discussion are warranted before responding to this inquiry.

Regards,

Jeff Taylor

Project Manager

BRINDERSON ENGINEERS & CONSTRUCTORS

3330 Harbor Blvd, Costa Mesa, CA 92626

Direct 714.466.7289 Cell 949.463.2469

**COP0020304**

---

**From:** Trewartha, Mark  
**Sent:** Wednesday, August 31, 2011 06:04 PM  
**To:** ROMERO Mike (ROMERO.Mike@deq.state.or.us); 'THIESSEN Kenneth' (THIESSEN.Kenneth@deq.state.or.us)  
**CC:** Hetrick, Eric G; Gdak, Chris; Sauze, Marc; McAlister, Robert  
**Subject:** FW: digging in Portland  
**Attachments:** img029.jpg; img030.jpg; img031.jpg; img032.jpg

Ken and Mike,

The following is a notification of pending work at the Chevron/CP Portland Terminal. The new project will be installing new pipe and footings. Details are presented below and on attached drawings. We will keep you posted on the schedule. Call if you have any questions.

Mark Trewartha, RG  
Senior Hydrogeologist  
Stantec

9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
Fx: (503) 297-5429  
Cell: (503) 807-8568  
mark.trewartha@stantec.com

stantec.com <<http://www.stantec.com>>

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ü Please consider the environment before printing this email.

---

**From:** Ron Barnett <[ron.barnett@sbcglobal.net](mailto:ron.barnett@sbcglobal.net)>  
**To:** Uyeda, Valerie J  
**Cc:** Edwards, Scott S; Ron Barnett <[ron.barnett@sbcglobal.net](mailto:ron.barnett@sbcglobal.net)>  
**Sent:** Tue Aug 30 13:53:48 2011  
**Subject:** Excavation Soil

Valerie please find drawings of the locations in the terminal where we will do excavation. We will be digging (9) bell holes located on the map by the letter A. Bell holes will be 4' X 6' X 2' deep. We will be digging (17) Drill Piers, drawing attached, locations are identified on the map with the letter B. We will be digging (7) sleeper, drawing attached, locations are identified on the map with the letter C. We will be digging (4) spread footing, drawing attached, locations are identified on the map with the letter D. All soil will be removed with dry vac excavation. No mechanical dig will be used. Estimated amount of excavated soil is 65-70 yards.

**COP0020305**

Ron Barnett

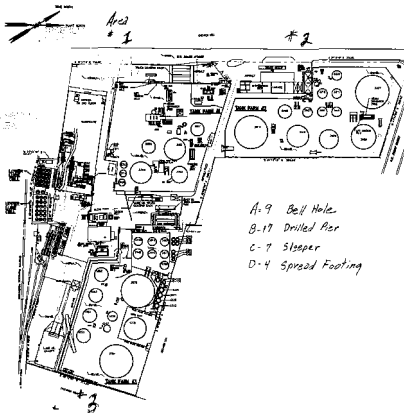
OQ NCCER # 6788398

API TES # 35926

(405) 343-2354



# Emergency Evacuation Guide



ConocoPhillips

COP0020307



Project: <u>Low Block On Rec-Use Slabs</u>	Contract No: <u>ENG-10014</u>
Area: <u>Foot- and .OR</u>	Engineer:
Drawing by: <u>A. Wagner</u>	Checked by: _____
	Date: <u>7-18-11</u>

PS-103-112

Use Heavy Hex Head ASTM A564  
GR 36, 3/4" bolts L=8"  
proj 5"

1/2" base plate  
6" gravel

#4 ties @ 2' c/c

8 #7 rebar

#4 ties @ 6" c/c

**TYPICAL DRILLED PIER**

3" cover

Min reinforcement

$$A_{s,min} = .01 A_g \cdot .01 \left( \frac{150}{4} \right) = 4.52^2/8$$

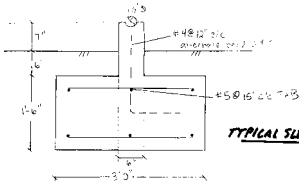
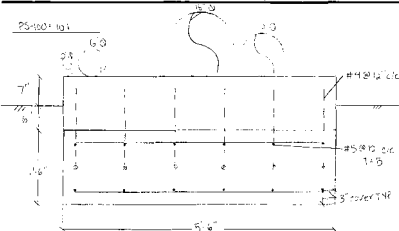
min of .565in per bolt

use 8 #7 rebar = 48" > 45.2" ✓



Project	COP Box 3 Perrygo Rd		Contract No.	Fig. 201-101
Area	Perrygo Rd		Circulator By	8-1
Drawing Set	Reinforced By	Checked by	Date	8/5/1

PS-100+101

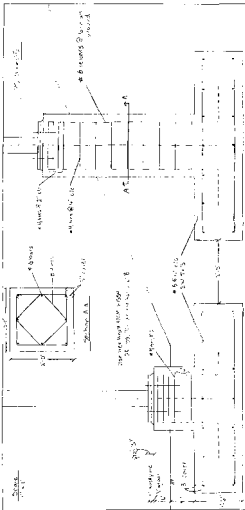


**TYPICAL SLEEPER**

ENGINEERS & CONSTRUCTORS  
3330 Harbor Boulevard, Suite 100 • Costa Mesa, CA 92626  
(714) 456-7800 • FAX (714) 456-7330

COP0020309

Scale  
1" = 1'



BRUNNEN  
100 YEARS OF  
EXCELLENCE

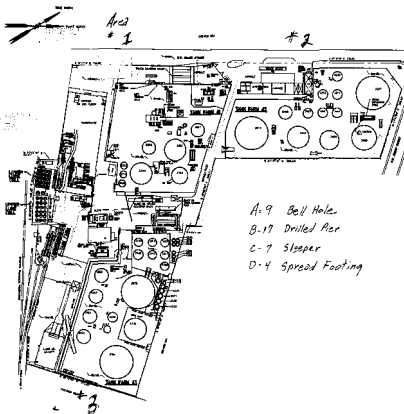
BRUNNEN is a leading manufacturer of reinforcement bars and mesh. The company's products are used in a wide range of applications, including bridges, highways, and buildings. Brunnen's products are known for their quality and durability.

BRUNNEN  
100 YEARS OF  
EXCELLENCE



# TYPICAL SPREAD FOOTING

# Emergency Evacuation Guide



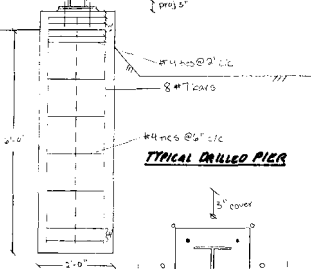


Project: <u>Cop Block On Rec-Column</u>	Contract No: <u>ENG-002312</u>
Area: <u>Foot-and-OR</u>	Engineer:
Drawn by: <u>A. Wagner</u>	Checked by: _____
Calculation by: _____	Date: <u>7-18-11</u>

PS-103-112

Use Heavy Hex Head ASTM A564  
GR 36, 3/4" bolts L=8"  
proj 5"

1/2" base plate  
6" x 6" girth



Min reinforcement

$$A_{s,min} = .01 A_g \left( \frac{f_c'}{f_y} \right) = 4.52' / 8$$

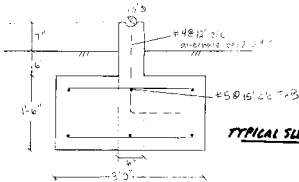
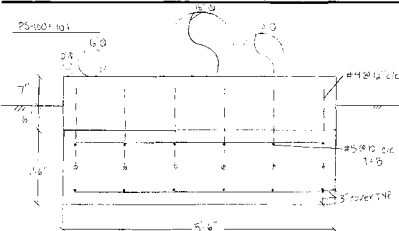
min of .565in per bolt

use 8 #7 rebar = 4.8" > 4.52" ✓



Project	COP Box 3 Perrygo Rd			Contract No.	Fig. 201-101
Area	Perrygo Rd			Circ. No.	8-1
Drawing of	Designed by	Checked by		Date	8/5/1

PS-100+101



**TYPICAL SLEEPER**

ENGINEERS & CONSTRUCTORS  
3330 Harbor Boulevard, Suite 100 • Costa Mesa, CA 92626  
(714) 456-7800 • FAX (714) 456-7330

COP0020313





---

**From:** Gdak, Chris  
**Sent:** Wednesday, September 14, 2011 05:19 PM  
**To:** ROMERO Mike; Trewartha, Mark; THIESSEN Kenneth  
**CC:** Uyeda, Valerie J; Hetrick, Eric G; Haberman, Phil; McAlister, Robert  
**Subject:** RE: Geotech drilling at Portland Terminal  
**Attachments:** PDX Terminal geotech fig.pdf

Hello all,

Please see answers to the questions (provided below). Please let us know if you have any additional concerns.

Thank you.

Chris Gdak  
Sr. Project Manager  
Stantec  
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Chris.Gdak@stantec.com  
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-----Original Message-----

From: ROMERO Mike [mailto:ROMERO.Mike@deq.state.or.us]  
Sent: Tuesday, September 13, 2011 5:13 PM  
To: Trewartha, Mark; THIESSEN Kenneth  
Cc: Gdak, Chris; Uyeda, Valerie J (Valerie.J.Uyeda@conocophillips.com)  
Subject: RE: Geotech drilling at Portland Terminal

Thanks Ken and Mark for handling this. I have a few questions:

1. What is the purpose of this deeper drilling? This work is being completed as part of a geotechnical evaluation needed to design new footings for pipe supports and an AST at the terminal. The anticipated depths of the individual borings (between 30'-60' bgs) is based on the opinion of our geotechnical engineers who have reviewed previous boring logs and feel that we need to drill to this depth to encounter sufficiently stable soils.

2. No work plan was provided so we are unaware of the techniques that will be employed. How will the borings be installed and what measures will be taken to guard against potentially exacerbating contamination in the borings (carrying contamination downward)?

Two of the borings (GB-1 and GB-2) will be drilled with a hollow-stem auger rig. One boring will be completed with a geoprobe with SPT capabilities. No wells will be installed and all borings will be backfilled with bentonite. Based on well logs, cross sections, and previous investigative work conducted in these areas (and nature of the impacts - lighter compounds), confining layers are not expected to be encountered to the maximum depth of the borings. Should field screening of soil samples and drill cuttings indicate the possible presence of contamination and/or confining layers, drilling will be stopped and a plan for addressing contamination concerns will be submitted to DEQ for review and approval.

3. What depth will the soil samples be collected at? Is there any benefit for the ongoing site characterization study to collect groundwater samples? Few, if any, groundwater samples have been collected at these depths at this site. The spacial distribution of the proposed boring locations could provide a snapshot of the groundwater at this depth across the site.

Soil samples will be collected at 5' intervals (for field-screening) to the depth of each boring. Select soil samples (based on field-screening) may be submitted for laboratory analysis. If

**COP0020315**

groundwater is encountered, groundwater samples will be collected and submitted for laboratory analysis. Groundwater samples will be analyzed for the following:

RBDM VOC's - 8260 MSV  
PAHs - 8270M SIM  
RCRA Metals - 6000/7000 series  
TPH as Gx and Dx

---

From: Trewartha, Mark [Mark.Trewartha@stantec.com]  
Sent: Tuesday, September 13, 2011 2:23 PM  
To: THIESSEN Kenneth; ROMERO Mike  
Cc: Gdak, Chris; Uyeda, Valerie J (Valerie.J.Uyeda@conocophillips.com)  
Subject: RE: Geotech drilling at Portland Terminal

Ken,

Just to keep you posted, drilling has been postponed one day. Startup will be on Thursday.

Mark Trewartha, RG  
Senior Hydrogeologist  
Stantec  
9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
Ph: (503) 297-1631 Ext. 207  
Fx: (503) 297-5429  
Cell: (503) 807-8568  
mark.trewartha@stantec.com  
stantec.com<<http://www.stantec.com>>

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From: Trewartha, Mark  
Sent: Monday, September 12, 2011 2:20 PM  
To: 'THIESSEN Kenneth' (THIESSEN.Kenneth@deq.state.or.us); ROMERO Mike (ROMERO.Mike@deq.state.or.us)  
Cc: Gdak, Chris; Uyeda, Valerie J (Valerie.J.Uyeda@conocophillips.com)  
Subject: Geotech drilling at Portland Terminal

Ken and Mike,

To confirm our earlier notification, proposed geotech borings are to be advanced Wednesday through Friday of this week. Depth of the borings will be approximately 50 to 60 'bgs. Stantec will be onsite to observe, collect soil samples, and submit select samples for analytical analysis if field screening indicates the possibility of contaminated soil. Also, if field screening does indicate the possibility of contaminated soil, soil will be managed per the Contaminant Media Management Plan.

If you have any questions, don't hesitate to contact me.

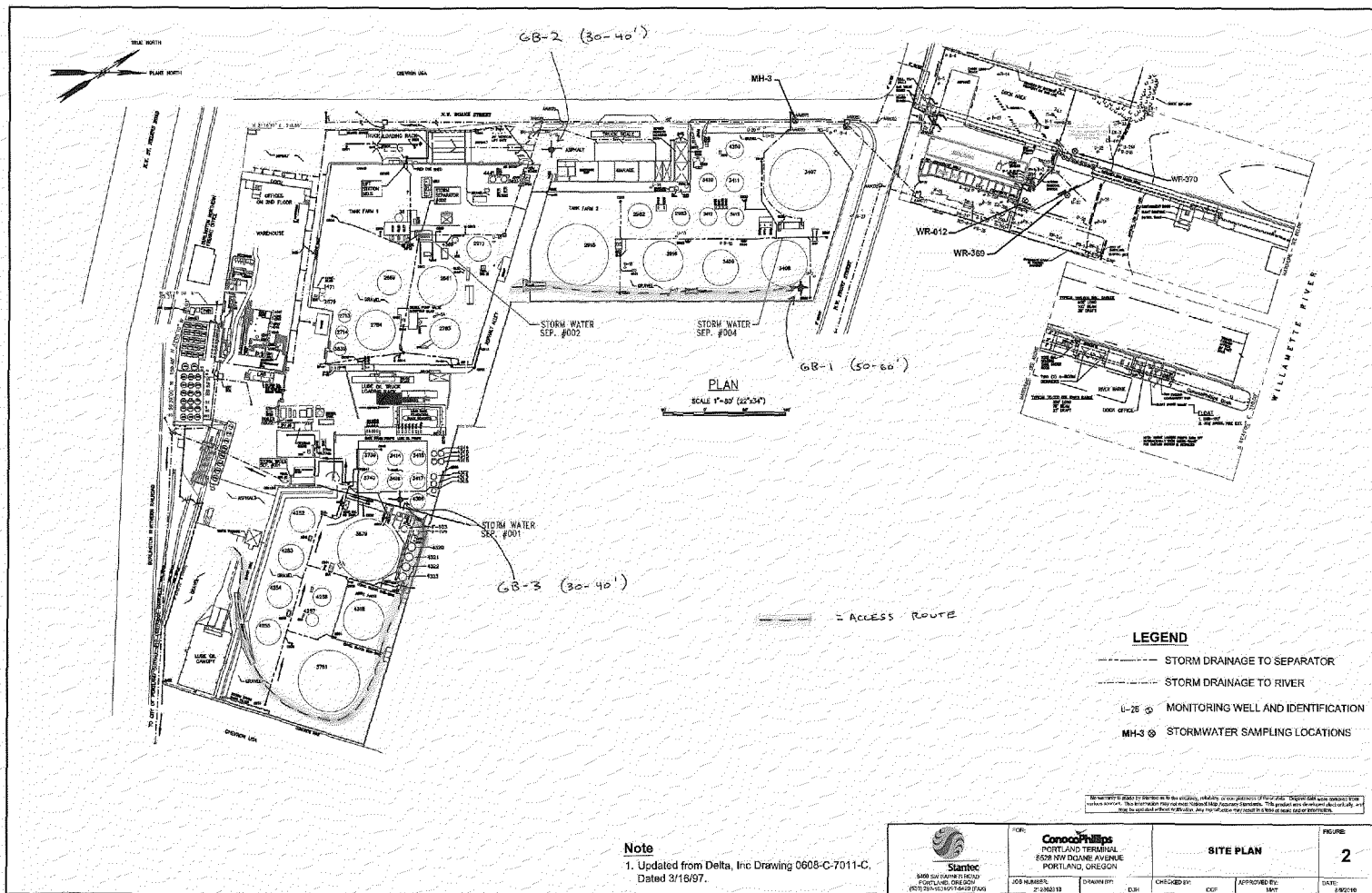
Mark Trewartha, RG  
Senior Hydrogeologist  
Stantec  
9400 SW Barnes Road Suite 200  
Portland OR 97225-6690  
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Fx: (503) 297-5429  
Cell: (503) 807-8568  
mark.trewartha@stantec.com<<mailto:mark.trewartha@stantec.com>>  
stantec.com<<http://www.stantec.com>>

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**COP0020316**





FILEPATH:\C1-CLIENTS\ConocoPhillips\50P\0622-PTLD TERMINAL\21302313-2010\21502313-SP FIG.283.dwg|D:\eller\Aug 12, 2010 at 16:23|Layout: FIG.2

COP0020318

**Fourth Quarter 2010 and First Quarter 2011 WTG Meeting**  
***Meeting Minutes***

**Date:** January 26, 2011

**Time:** 2:00 pm (Pacific Standard Time)

**Location:** 7<sup>th</sup> Floor Conference Room; 111 SW Columbia Street

**Phone:** 877.999.1272

**Password:** 7513028#

---

**Opening Statements**

- a. Eric Hetrick taking over as ConocoPhillips PM from Rich Solomon
  - b. Updated schedules were provided to DEQ
1. **Safety Moment** – Discussed use of electrical appliances to cook food in office environments. Always monitor cooking process and don't leave appliances unattended.
  2. **Vapor Intrusion/Risk Assessment Update**
    - **Chevron** – no releases since 2003, vapor intrusion work plan only
      - **Deliverable** – CVX submitted VI Evaluation outline to DEQ
    - **ConocoPhillips** – no releases since 2003, vapor intrusion work plan only
      - **Deliverable** – CP submitted VI Evaluation outline to DEQ
    - **Kinder Morgan** - Work plan outline to evaluate risks associated with Aviation Fuel, Gasoline, and Jet Fuel releases and vapor intrusion work plan. KM will be updating the upland RA with new data.
      - **Pending deliverable** – KM will submit Risk Assessment Outline Document to DEQ
  3. **Storm Water Source Control Evaluation Update**
    - **ConocoPhillips** – SWSCE Report is in final review. Will be provided to DEQ soon.
    - **Chevron** – SWSCE Report provided to DEQ in 2010. Pending DEQ review.
    - **Kinder Morgan** – Last of the continuous flow data has been collected; similar to the batch data. Data includes 2 first flush and 2 dry flow event samples.

- **Work to be done** – Camera inspections and integrity checks
- **Pending deliverable** – Tech Memo data submittal of stormwater data to the DEQ

#### 4. Groundwater Source Control Evaluation Update

- **ConocoPhillips/Chevron** – Received client comments
  - **Work to be done** – incorporate comments and provide to clients for second round of comments
  - **Pending Deliverable** – anticipate delivery to DEQ by end of February
- **Kinder Morgan** – Antea will utilize Arcadis/Stantec outline for report as appropriate for uniformity; on track for submittal this year.

#### 5. Overwater Source Control Evaluation Update

DEQ acknowledged that overwater operations at the terminals cannot be significantly altered or changed and referred to evaluation as “book report” presenting SOPs/contingency plans/emergency spill response.

- **ConocoPhillips** – The Stormwater SCE Report will be updated to address this pathway.
- **Chevron** – OWSCE Report provided to DEQ in 2010. Pending DEQ review.
- **Kinder Morgan** – will add to project schedule

#### 6. NW Doane Avenue Storm Sewer Update – ARCADIS

- **Work completed** – 2 rounds of wet weather samples collected, surveying, dry weather flow inspections
- **Work to be done** – 2 additional wet weather sampling events

#### 7. Redesign of the GWET System – ARCADIS

- **Work completed** – preparation of the 30% and 60% design documents, client review
- **Work to be done** – incorporation of client comments and preparation of final design

#### 8. ConocoPhillips Terminal Projects Update – Stantec

- MH-9 access pending agreement with BNSF
- Catch basin cleanout sampling is completed and will be presented in the Stormwater SCE Report
- AST cathode installation sampling showed no significant impacts. A memo will be prepared documenting field work.

#### 9. Chevron Terminal Projects Update - ARCADIS

- Ethanol Spill Focused FS – Pending DEQ review

- Enhanced Bio Pilot Study – Work plan to install additional injection wells pending DEQ review
- API OWS Repair – Letter report summarizing pipe repair, soil and groundwater handling pending DEQ review.

## **10. Kinder Morgan Terminal Projects Update - Delta**

- Saltzman Creek Sampling – Influent and effluent samples collected. DEQ to supply data from DEQ sediment sampling. Antea to supply the DEQ with Tech Memo data submittal of sampling to date.
- Tank 4 DDT Field Work – DDT report almost complete, after finalized will be sent to DEQ and Chevron/Arcadis to look at cooperative additional characterization around MW-22. Antea to supply Arcadis with DDT data.
- Certain Teed Property Line Assessment – Access Agreement with CertainTeed still in negotiation; Ken Thiessen will work with KM on access, potential meeting on Feb 8<sup>th</sup> with KM and DEQ.
- Seep Assessment – Antea research shows wells upgradient of seeps are appropriately screened, seeps were re-sampled and data looks promising.

## **11. Closing Thoughts - All**

- DEQ was notified of upcoming construction work at the ConocoPhillips Terminal. Stantec will provide schedule when available.
- Mike Romero requested each site evaluate the presence of cathodic protection wells and construction depths relative to potential preferential pathway to the Columbia River Basalts.
- Erodible Soils Pathway – first draft report sent in 2007. Some more work/data to be added;
  - Include weight of evidence arguments
  - Keep it a single group document, with site-specific sections on individual actions taken to control erosion and/or beach maintenance
- Action Item Discussion – Next meeting schedule for March 2011. Antea Group will host.

**Fourth Quarter 2010 and First Quarter 2011 WTG Meeting**  
***Meeting Agenda***

**Date:** January 26, 2011

**Time:** 2:00 pm (Pacific Standard Time)

**Location:** 7<sup>th</sup> Floor Conference Room; 111 SW Columbia Street

**Phone:** 877.999.1272

**Password:** 7513028#

---

**1. Safety Moment**

**2. Introductions – Eric Hetrick new CP PM for Portland Terminal.**

**3. Vapor Intrusion/Risk Assessment Update**

- **Chevron** – no releases since 2003, vapor intrusion work plan only
- **ConocoPhillips** – no releases since 2003, vapor intrusion work plan only – DEQ was verbally notified of proposed upcoming construction work. Stantec would provide updates to DEQ when scheduling was finalized.
- **Kinder Morgan** – Work Plan to evaluate risks associated with Aviation Fuel, Gasoline, and Jet Fuel releases and vapor intrusion work plan

**4. Storm Water Source Control Evaluation Update**

- **ConocoPhillips** – Stantec – In final review stages. Will be submitted to DEQ shortly.
- **Chevron** – ARCADIS
- **Kinder Morgan** – Delta

**5. Groundwater Source Control Evaluation Update**

- **ConocoPhillips/Chevron** – ARCADIS
- **Kinder Morgan** – Delta

**6. Overwater Source Control Evaluation Update**



# ARCADIS

- **ConocoPhillips** – Stantec – Will be addressed in Stormwater SCE.
- **Chevron** – ARCADIS
- **Kinder Morgan** - Delta

## **7. NW Doane Avenue Storm Sewer Update - ARCADIS**

## **8. Redesign of the GWET System - ARCADIS**

## **9. ConocoPhillips Terminal Projects Update – Stantec**

- MH-9 access Waiting access agreement with BNSF
- Catch Basin Cleanout Sampling Results presented in SCE
- AST Cathode Installation Sampling No significant impacts noted. Memo with results has been prepared

## **10. Chevron Terminal Projects Update - ARCADIS**

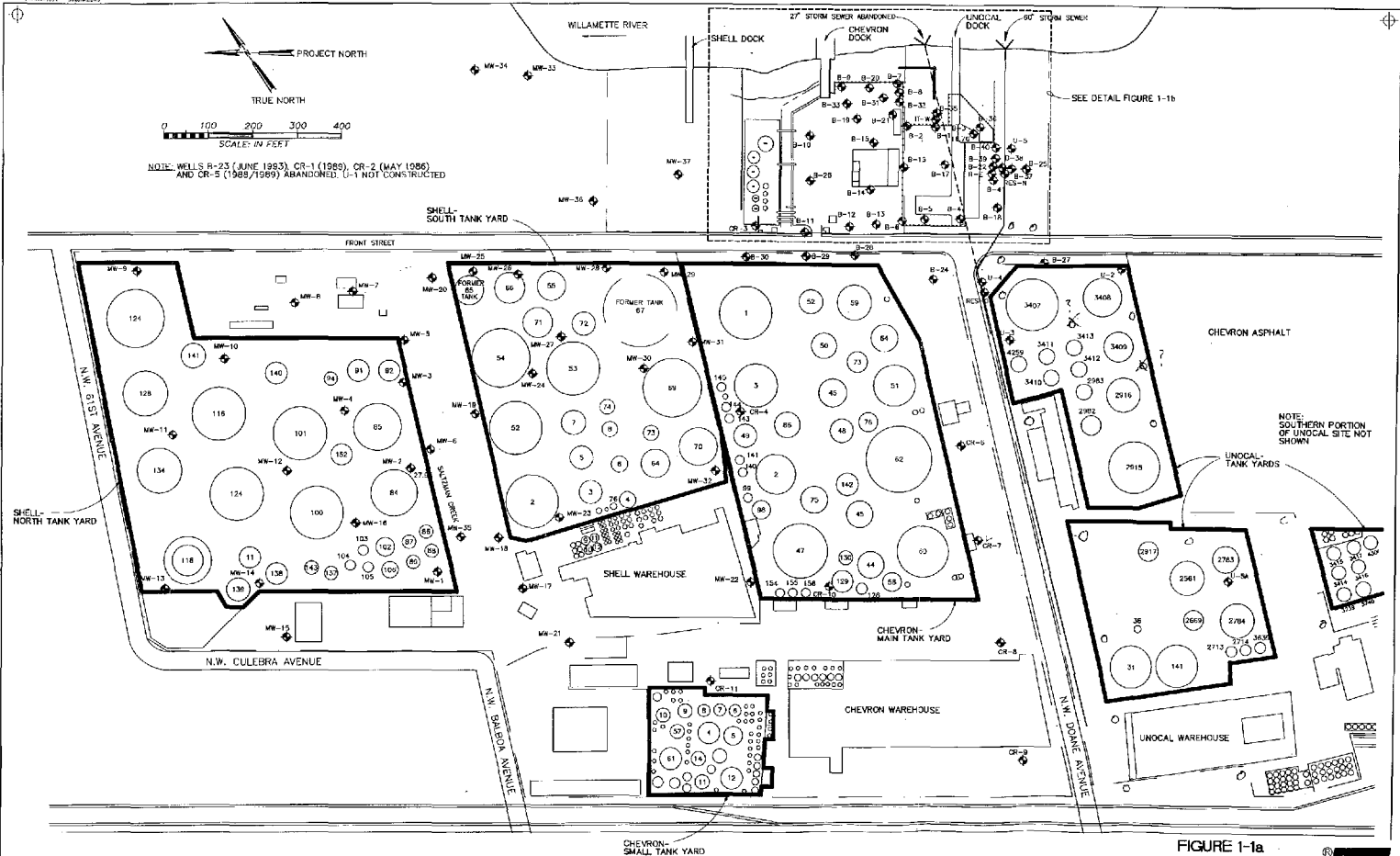
- Ethanol Spill Focused FS
- Enhanced Bio Pilot Study
- API OWS Repair

## **11. Kinder Morgan Terminal Projects Update - Delta**

- Saltzman Creek Sampling
- Tank 4 DDT Field Work
- Certain Teed Property Line Assessment
- Seep Assessment

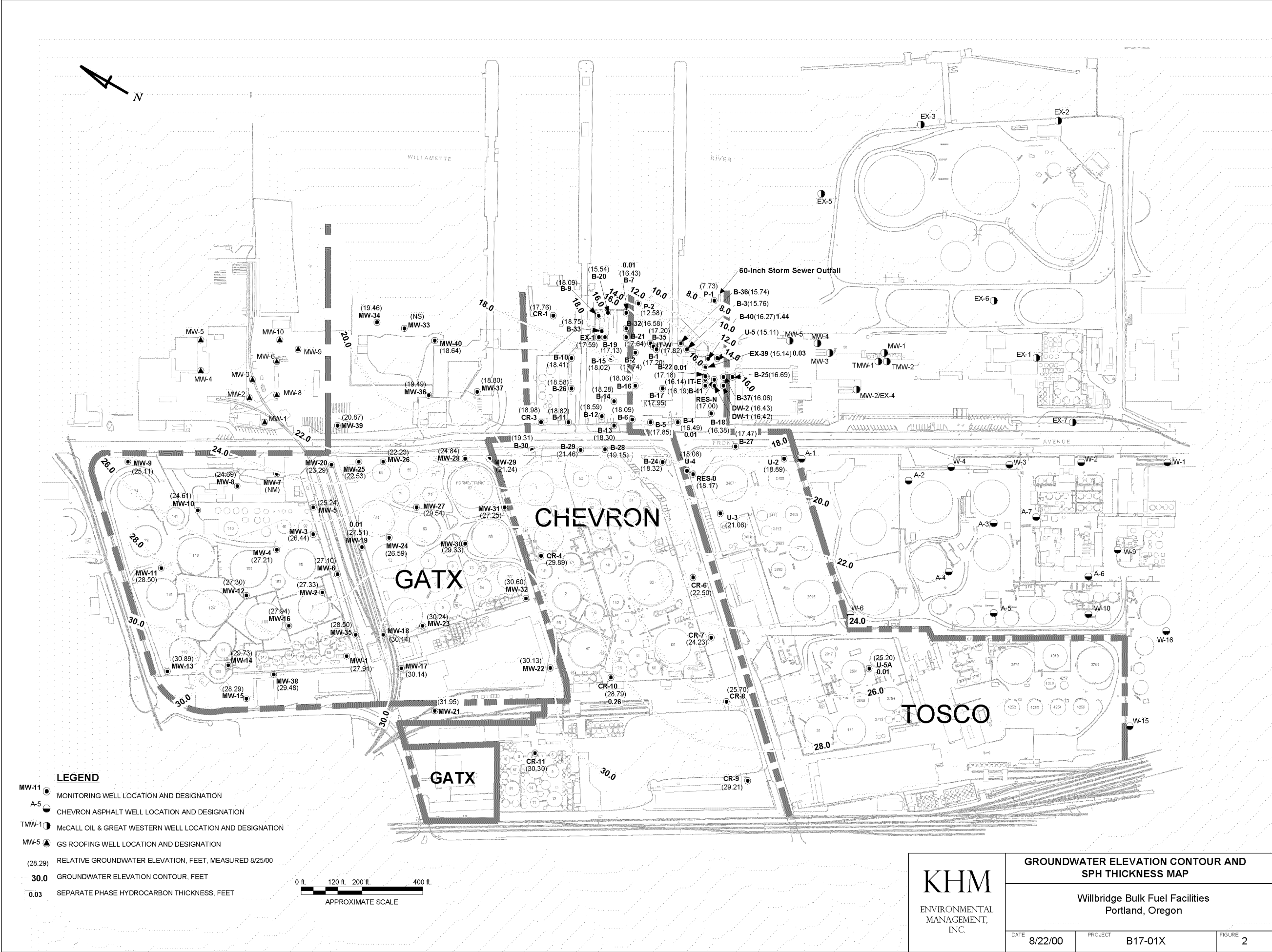
## **12. Closing Thoughts - All**

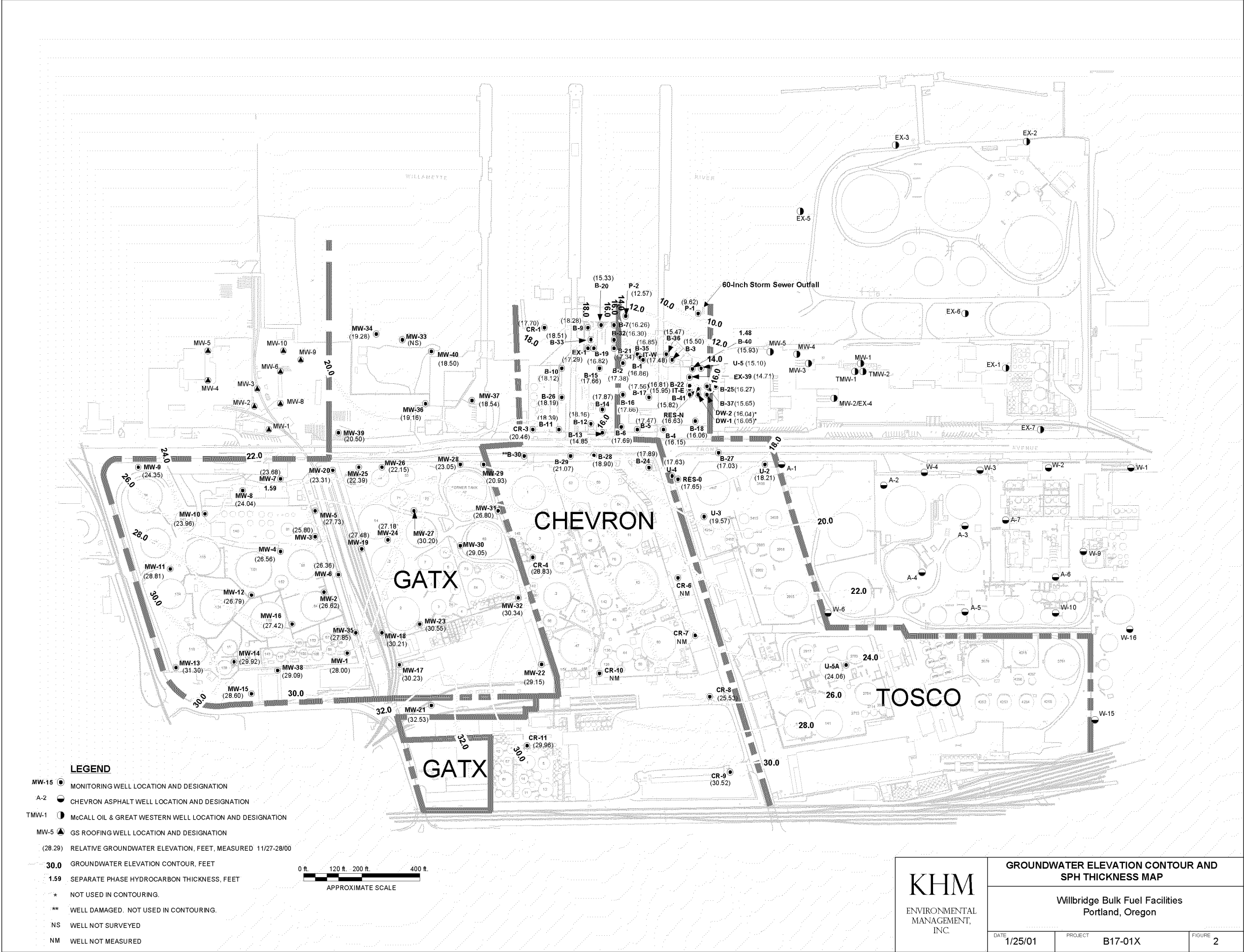
- Erodible Soils Pathway
- Action Item Discussion

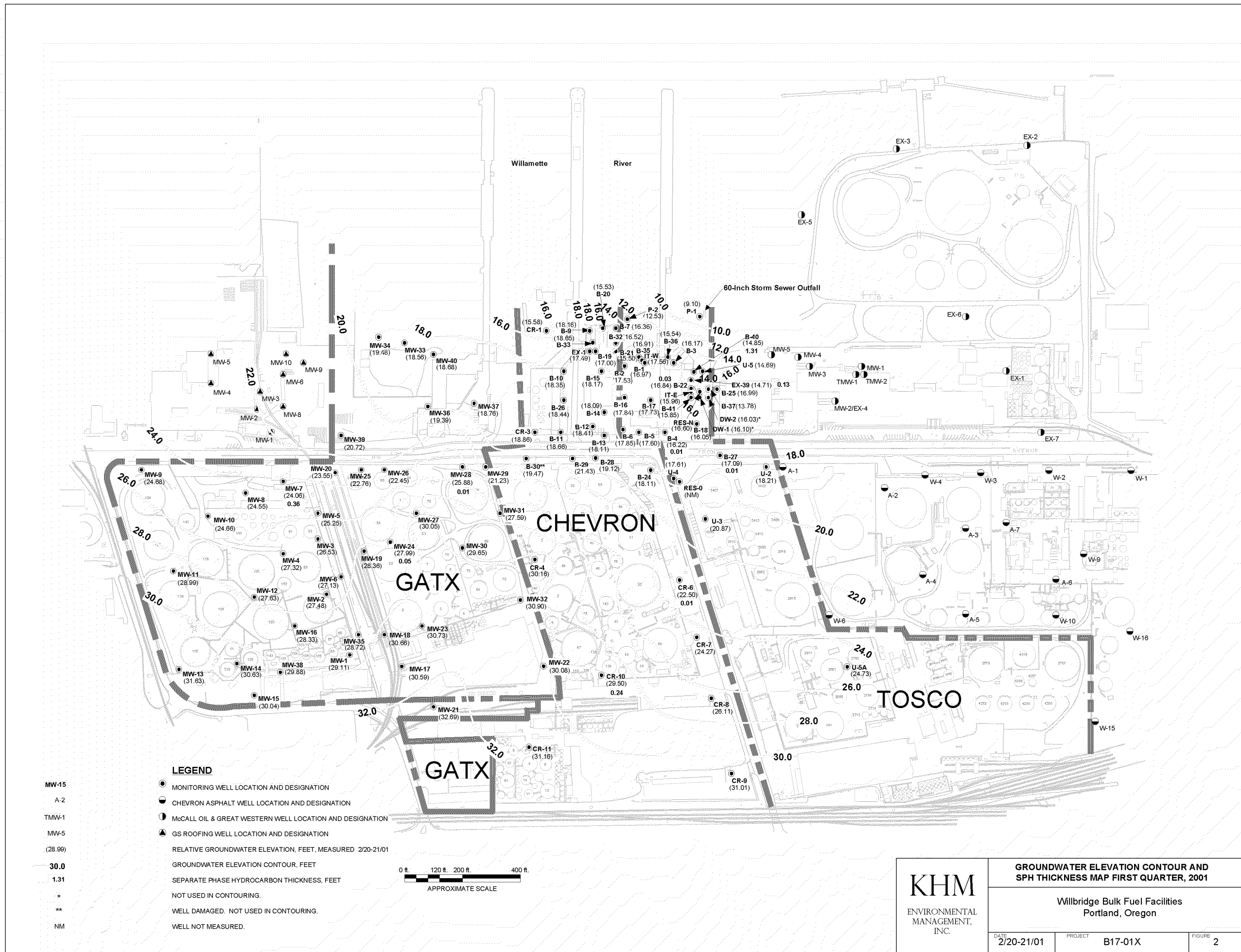


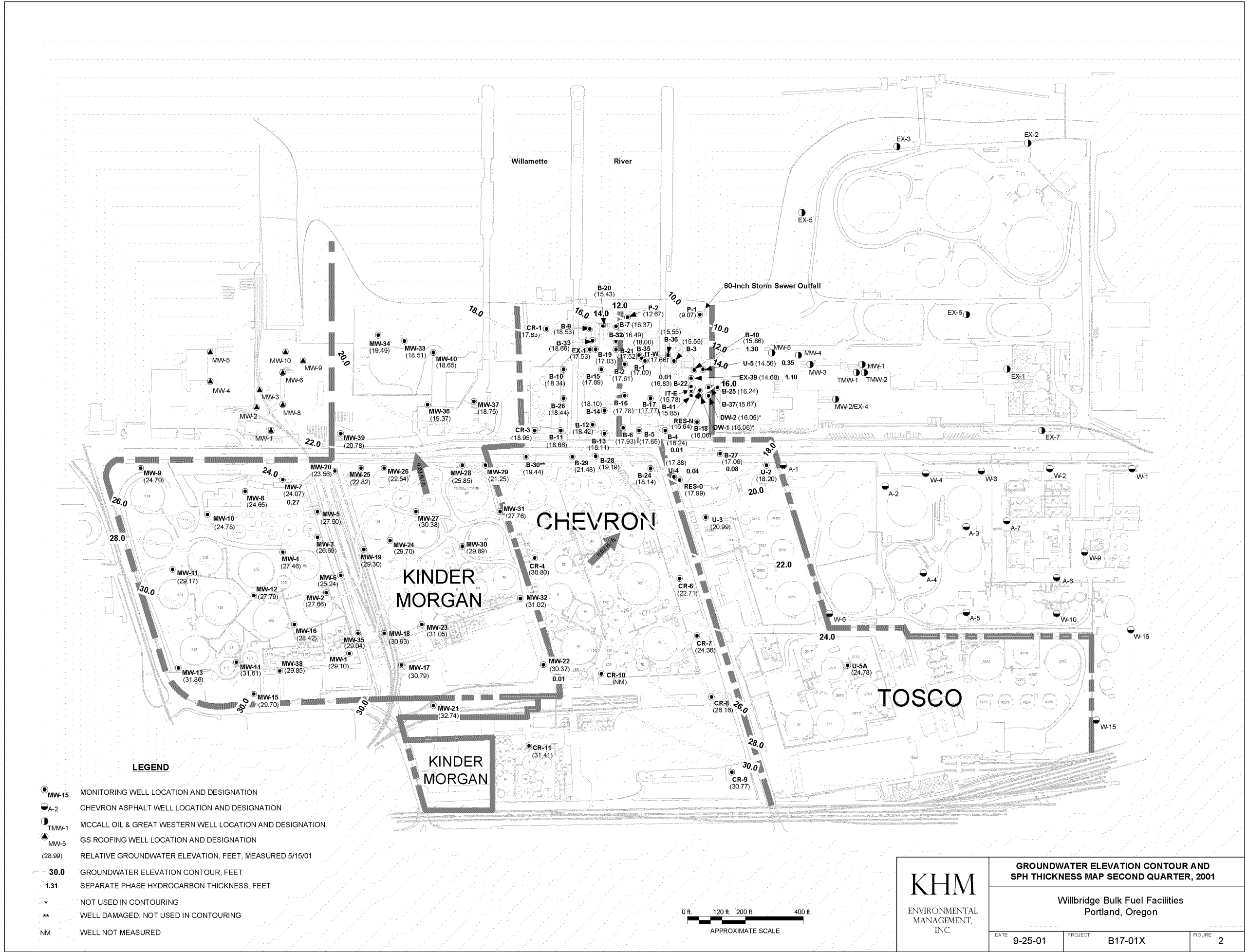
**FIGURE 1-1a**  
**SITE PLAN**  
Willamette Facilities  
Portland, Oregon



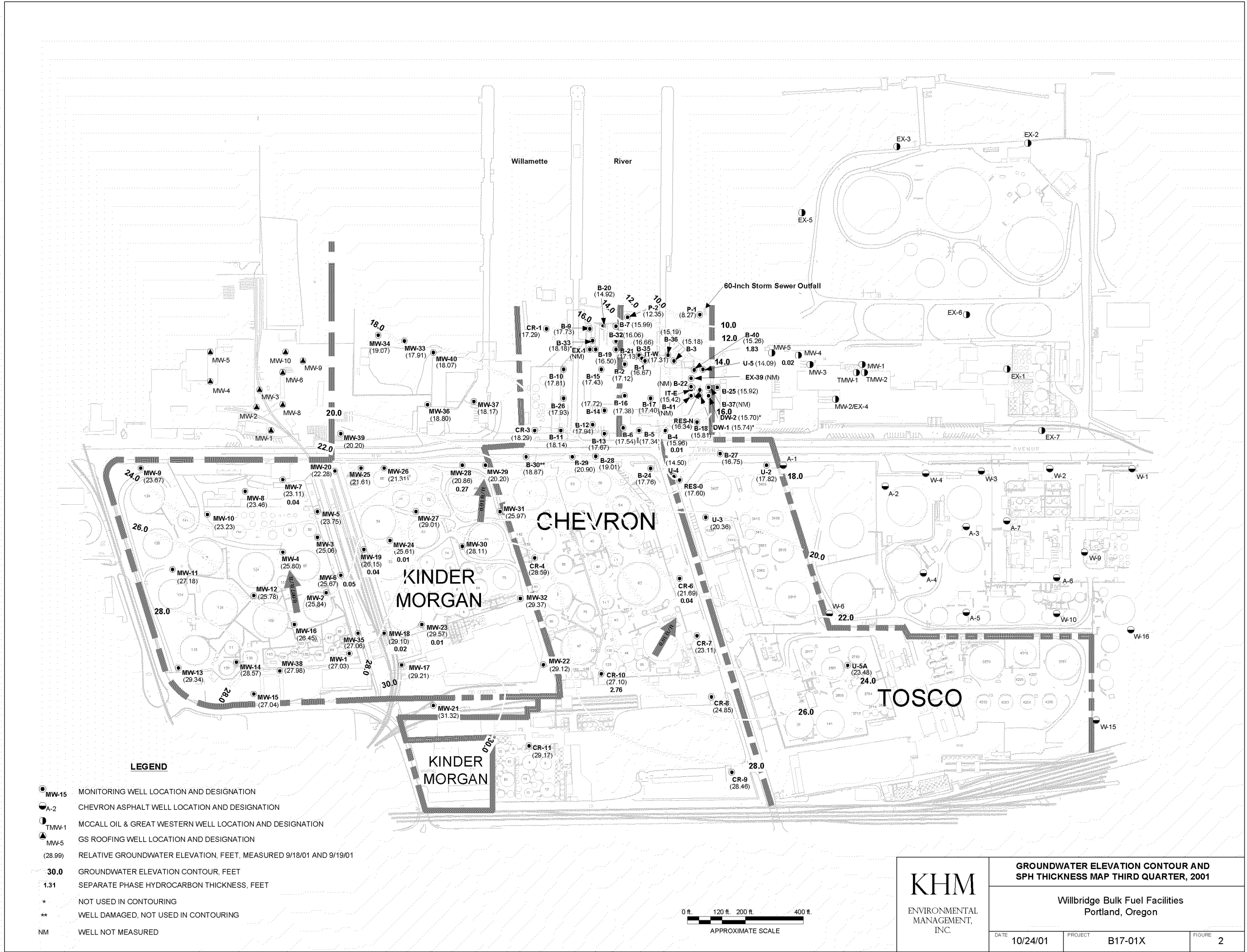


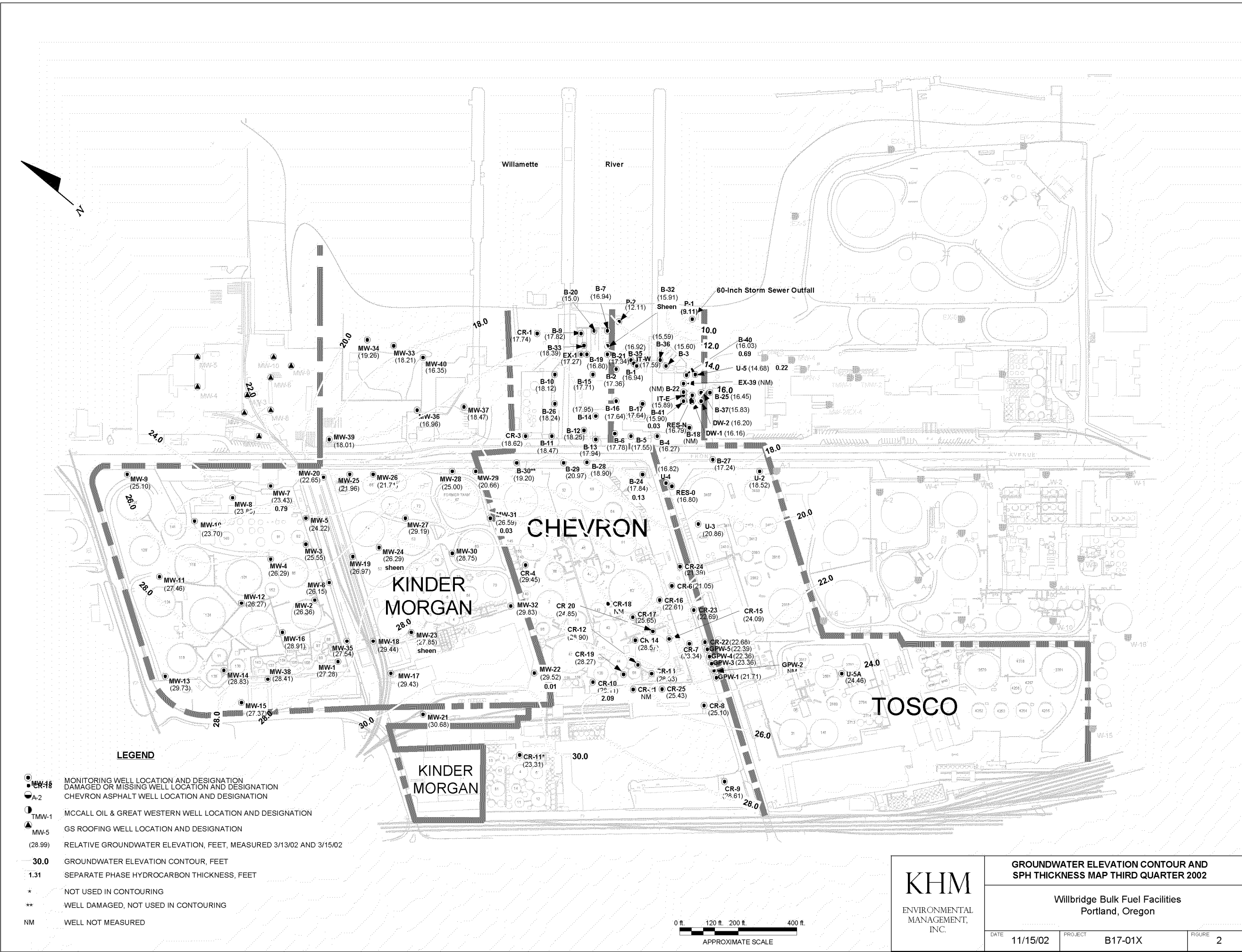




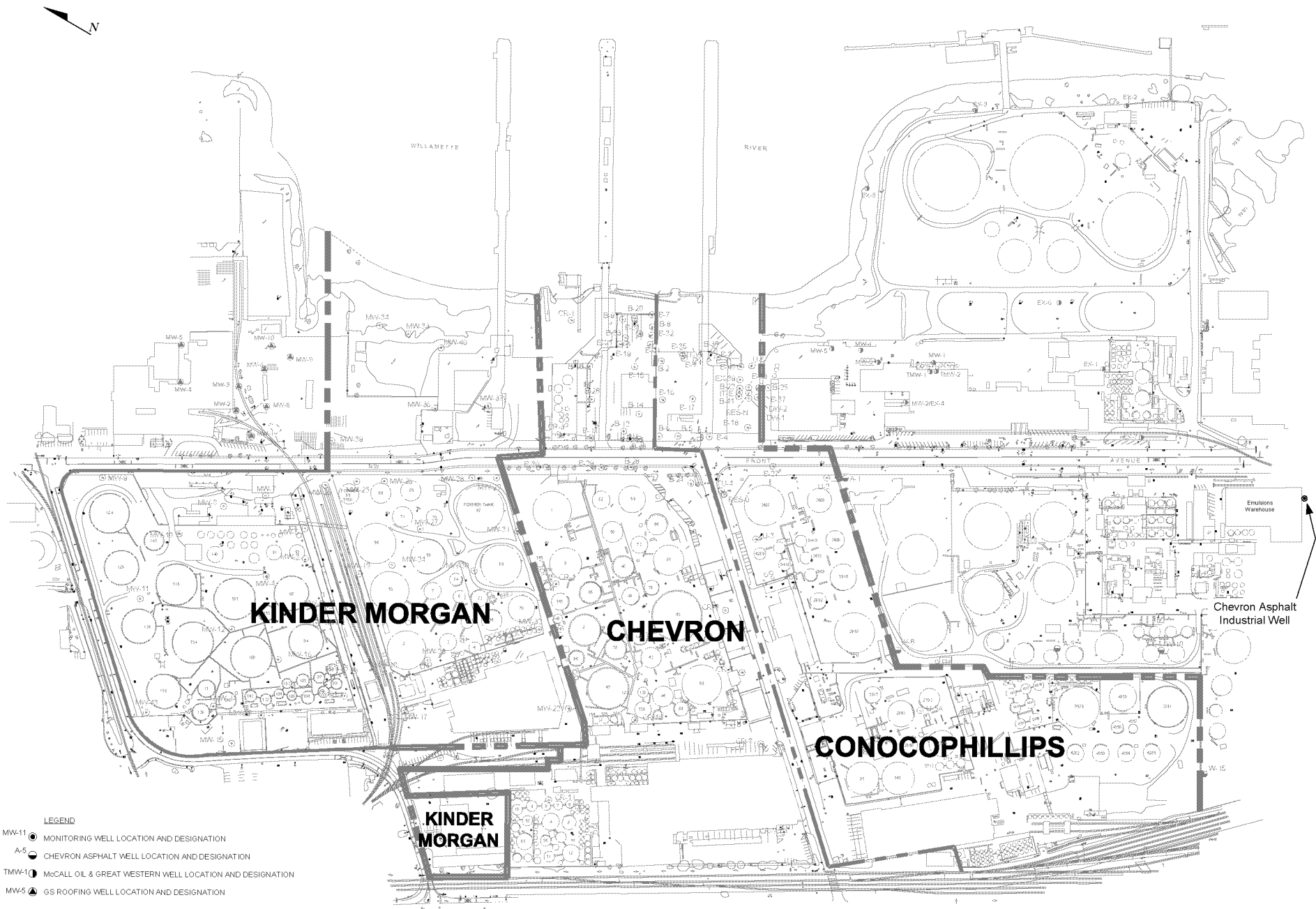












<b>KHM</b> ENVIRONMENTAL MANAGEMENT INC.	TITLE Site Wide Facility Map		
	<b>Willbridge Facility</b> Remedial Investigation Portland, Oregon		
DATE June 2003	PROJECT B17-01G	FIGURE 2	

## PORTLAND AND SEATTLE RY.

WILLAMETTE RIVER BRIDGE  
AT PORTLAND

Scale 1" = 400'

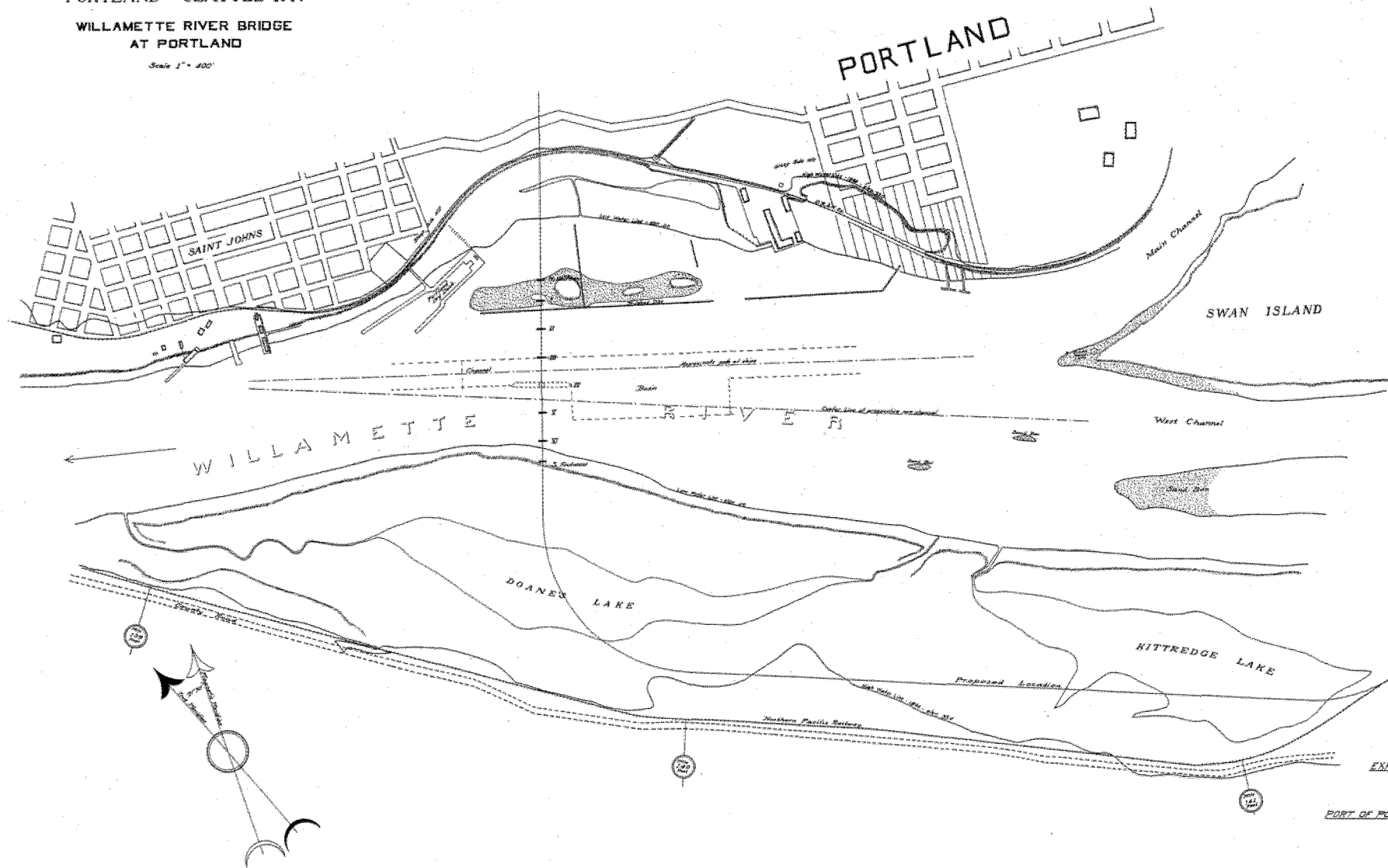


EXHIBIT NO. 17

SUBMITTED BY

PORT OF PORTLAND BRIDGE COM.

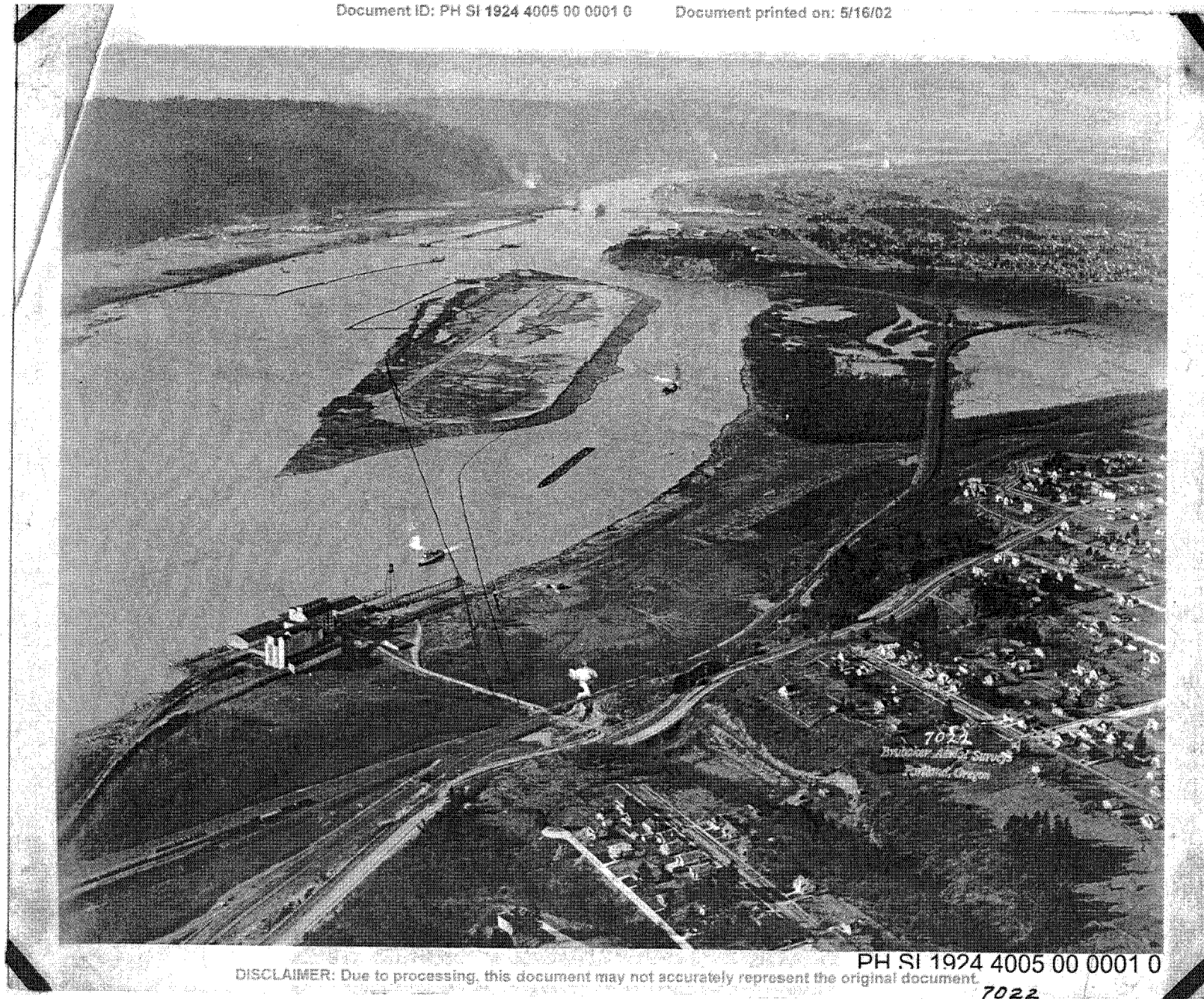
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FEB. 17th 1906

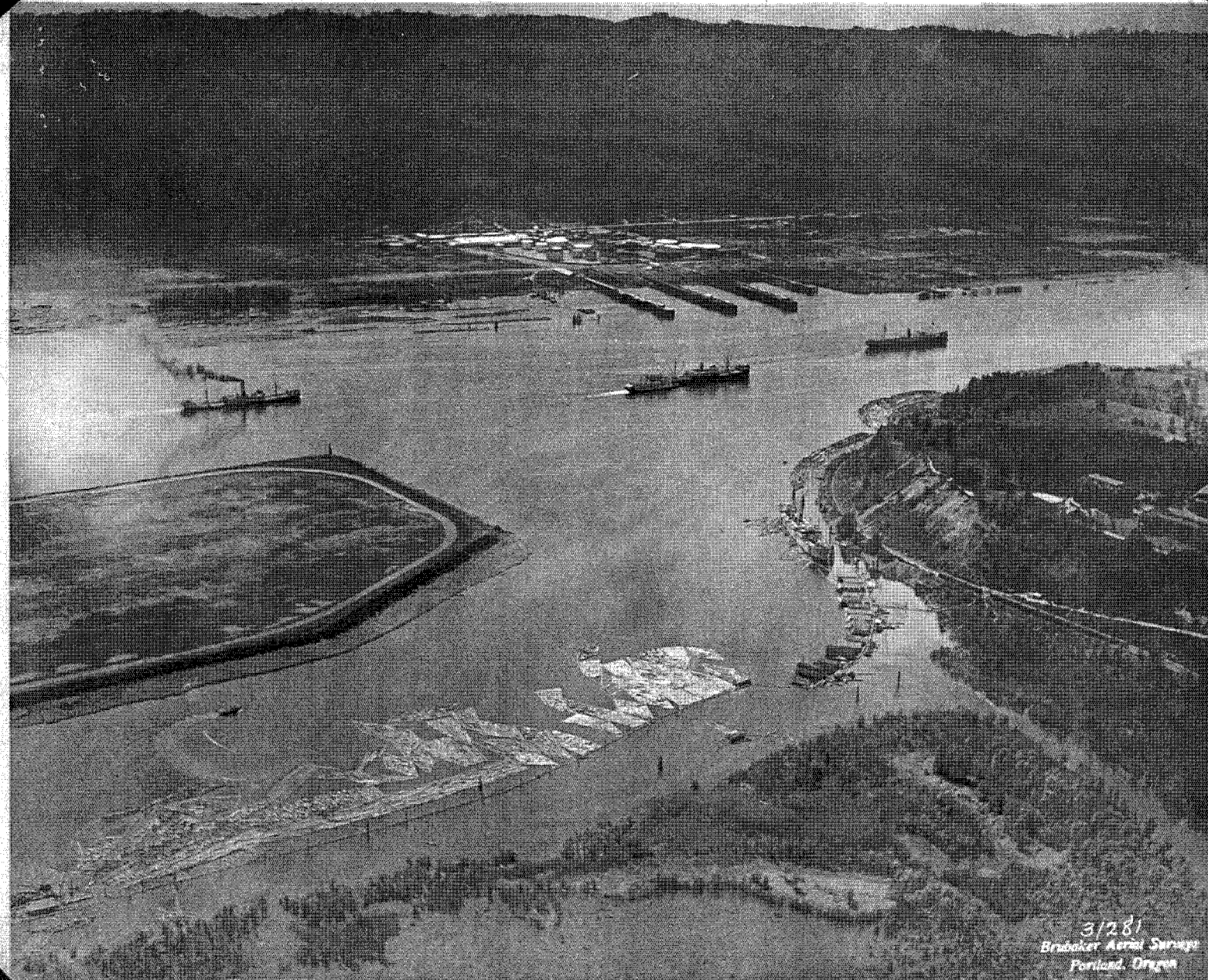
C.A.S.

MP WR 1906-4002 2/2 Care F. 15.

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3/28/1  
Brubaker Aerial Surveys  
Portland, Oregon

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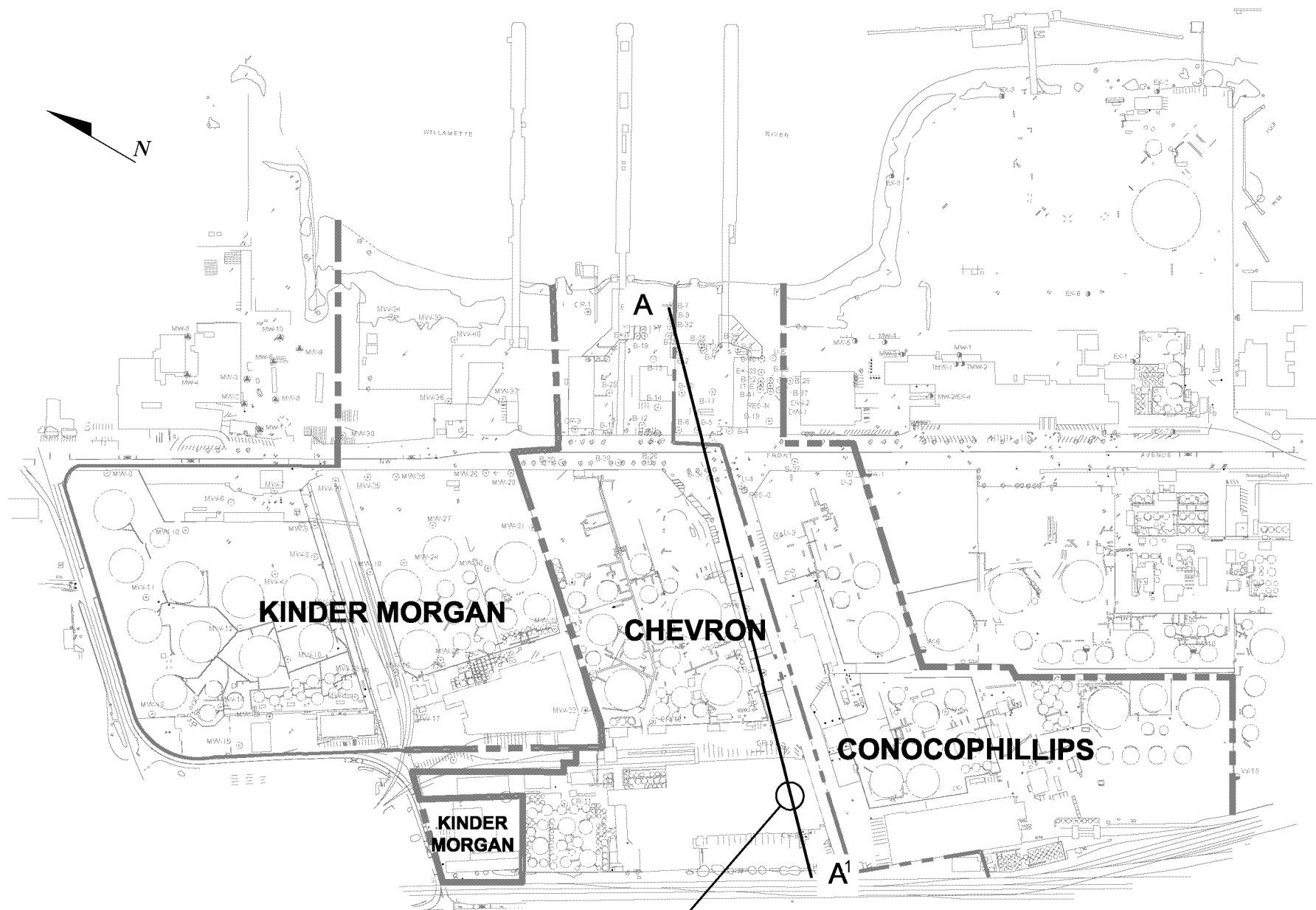
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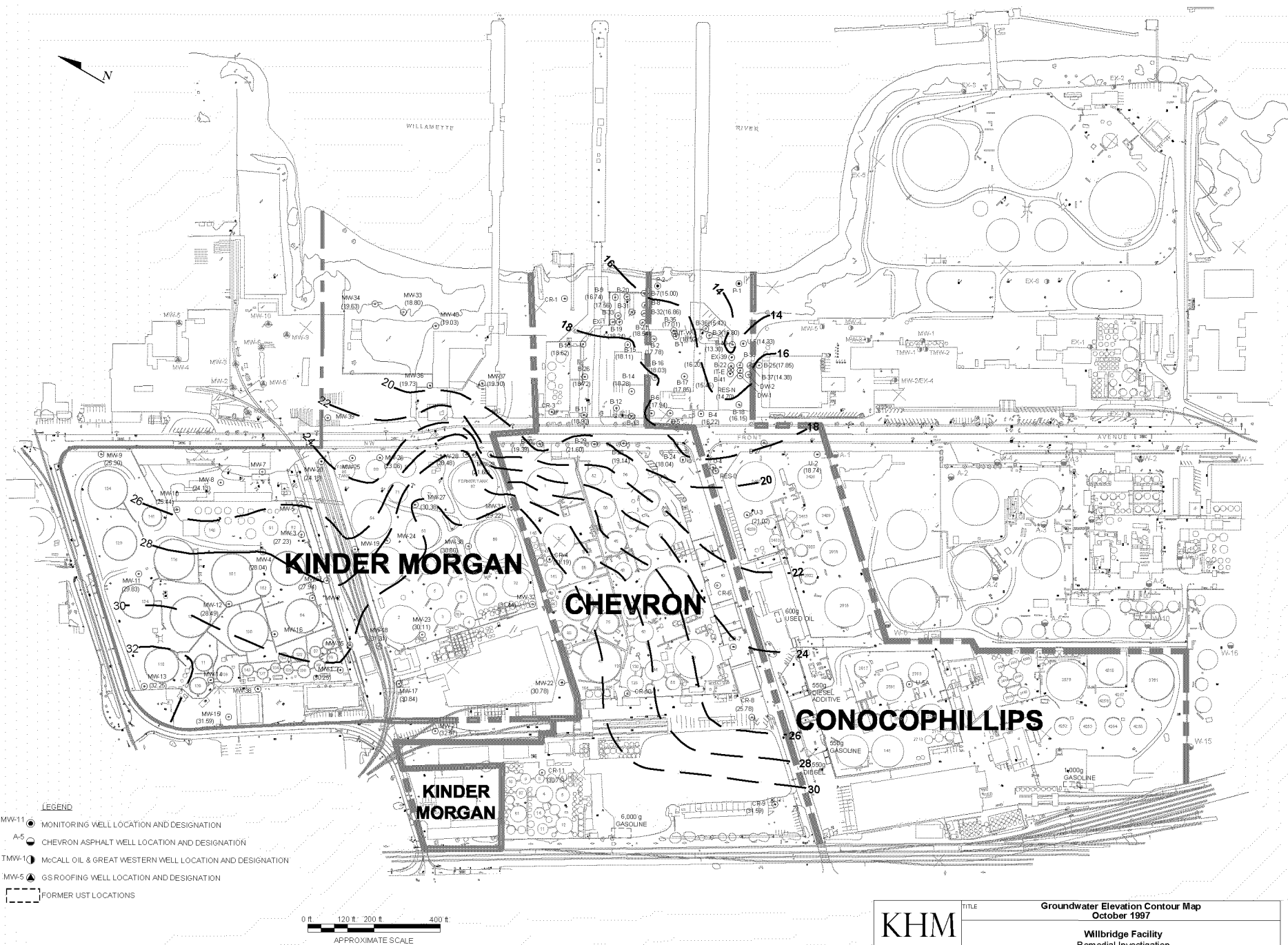
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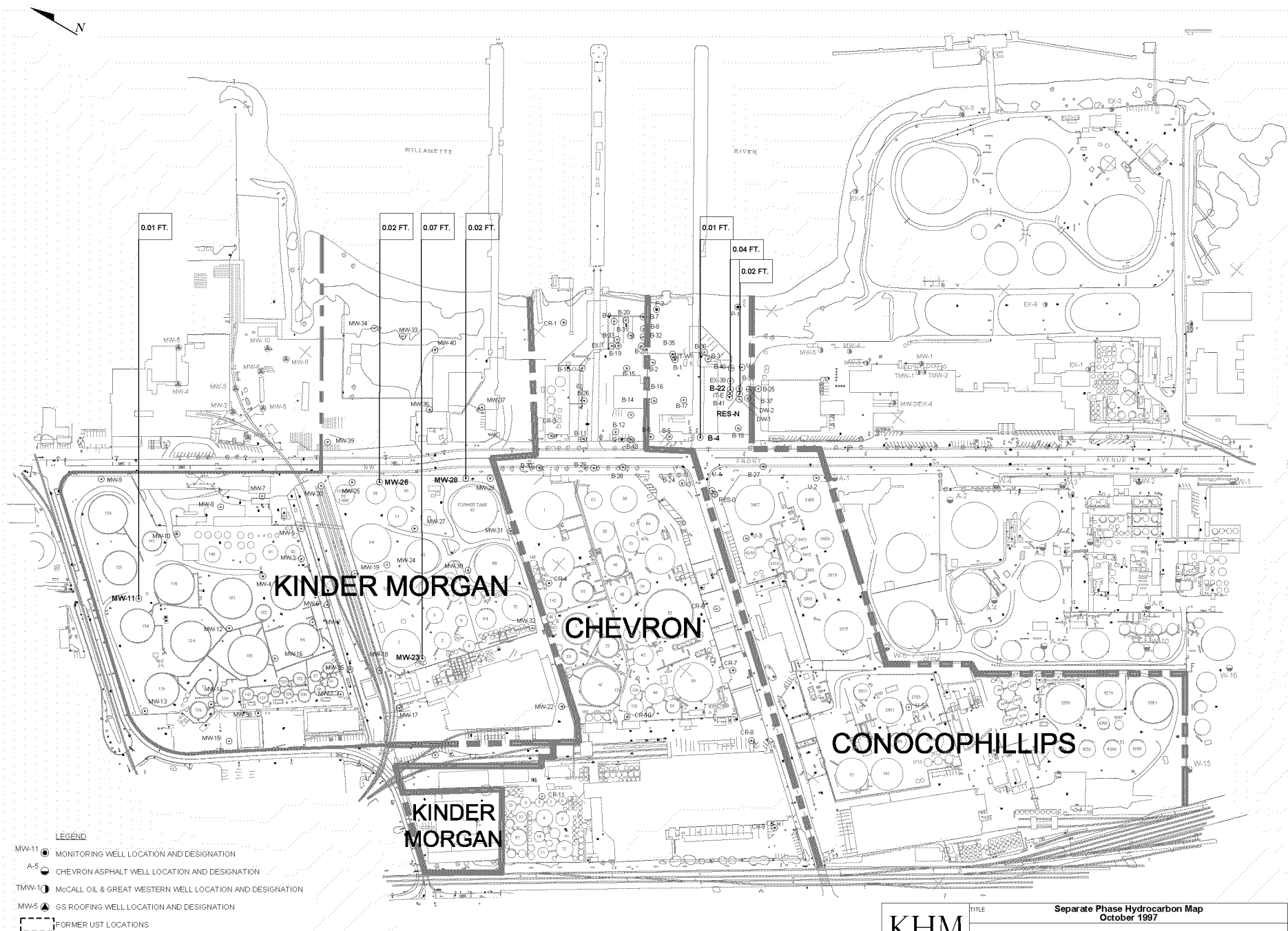




Cross Section Alignment

<b>KHM</b> ENVIRONMENTAL MANAGEMENT INC.	Geologic Cross-Section Map		
	<b>Willbridge Facility</b> Remedial Investigation Portland, Oregon		
DATE	June 2003	PROJECT	B17-01G
FIGURE	14		





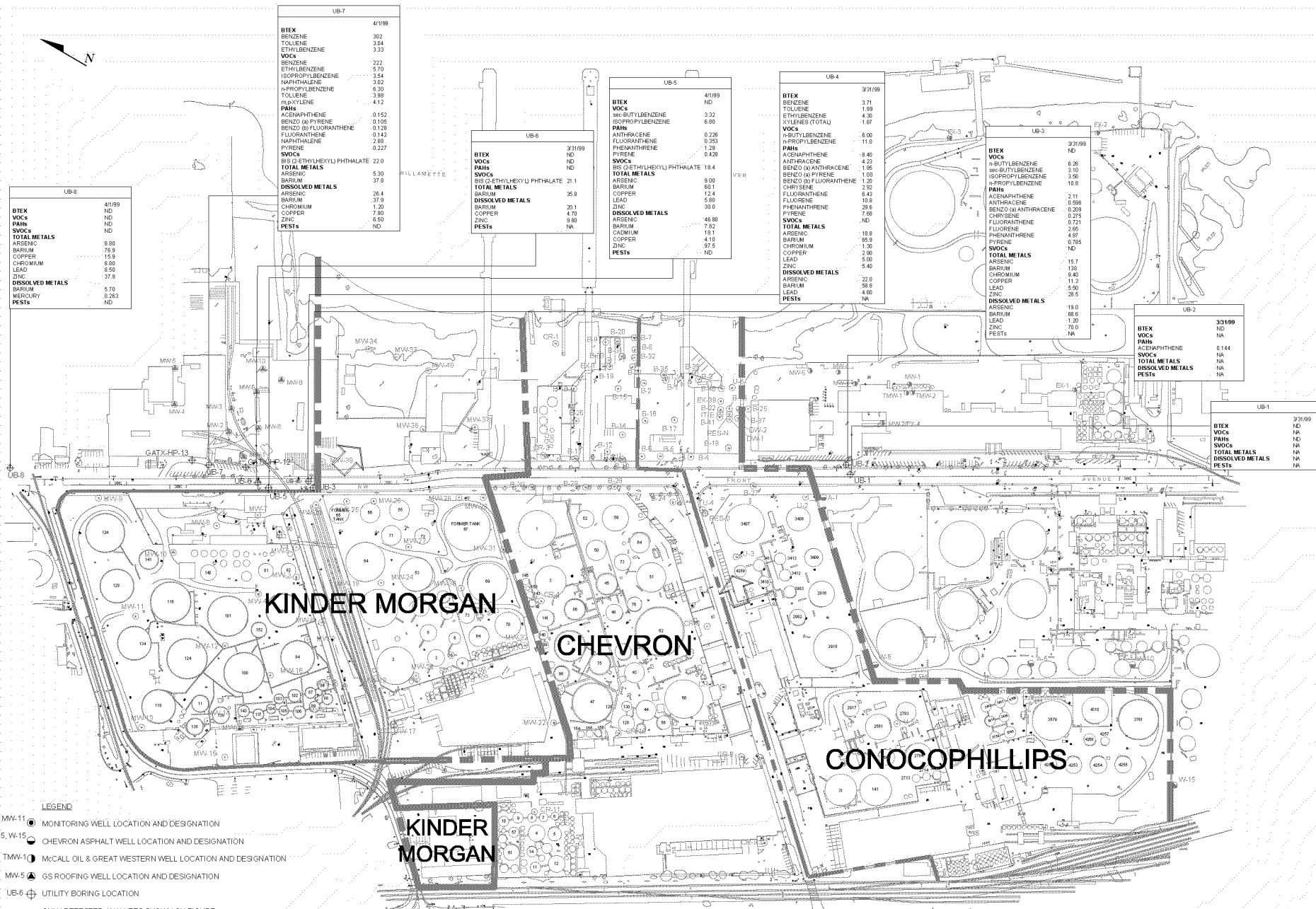
# LEGEND

- MW-11 MONITORING WELL LOCATION AND DESIGNATION
- A-1 CHEVRON ASPHALT WELL LOCATION AND DESIGNATION
- TMW-1 Mccall OIL & GREAT WESTERN WELL LOCATION AND DESIGNATION
- MW-5 GS ROOFING WELL LOCATION AND DESIGNATION
- FORMER UST LOCATIONS

0 ft. 120 ft. 200 ft. 400 ft.  
APPROXIMATE SCALE

**KHM**  
ENVIRONMENTAL  
MANAGEMENT  
INC.

TITLE			Separate Phase Hydrocarbon Map October 1997
			Willbridge Facility Remedial Investigation Portland, Oregon
DATE	June 2003	PROJECT	B17-01G
		FIGURE	17



# LEGEND

- MW-11 MONITORING WELL LOCATION AND DESIGNATION
- A-5, W-15 CHEVRON ASPHALT WELL LOCATION AND DESIGNATION
- TMW-10 McCall OIL & GREAT WESTERN WELL LOCATION AND DESIGNATION
- MW-5 GS ROOFING WELL LOCATION AND DESIGNATION
- UB-6 UTILITY BORING LOCATION

ONLY DETECTED ANALYTES SHOWN ON FIGURE

ND = NOT DETECTED  
NA = NOT ANALYZED

BTEX ANALYZED BY USEPA METHOD 8020A  
PAHs ANALYZED BY USEPA METHOD 8270M-SIM  
SVOCs ANALYZED BY USEPA METHOD 8270/8270M  
PESTICIDES ANALYSIS BY USEPA METHOD 8260  
METALS ANALYSIS BY USEPA METHOD 6000/7000 SERIES  
RESULTS IN ug/L (ppt)

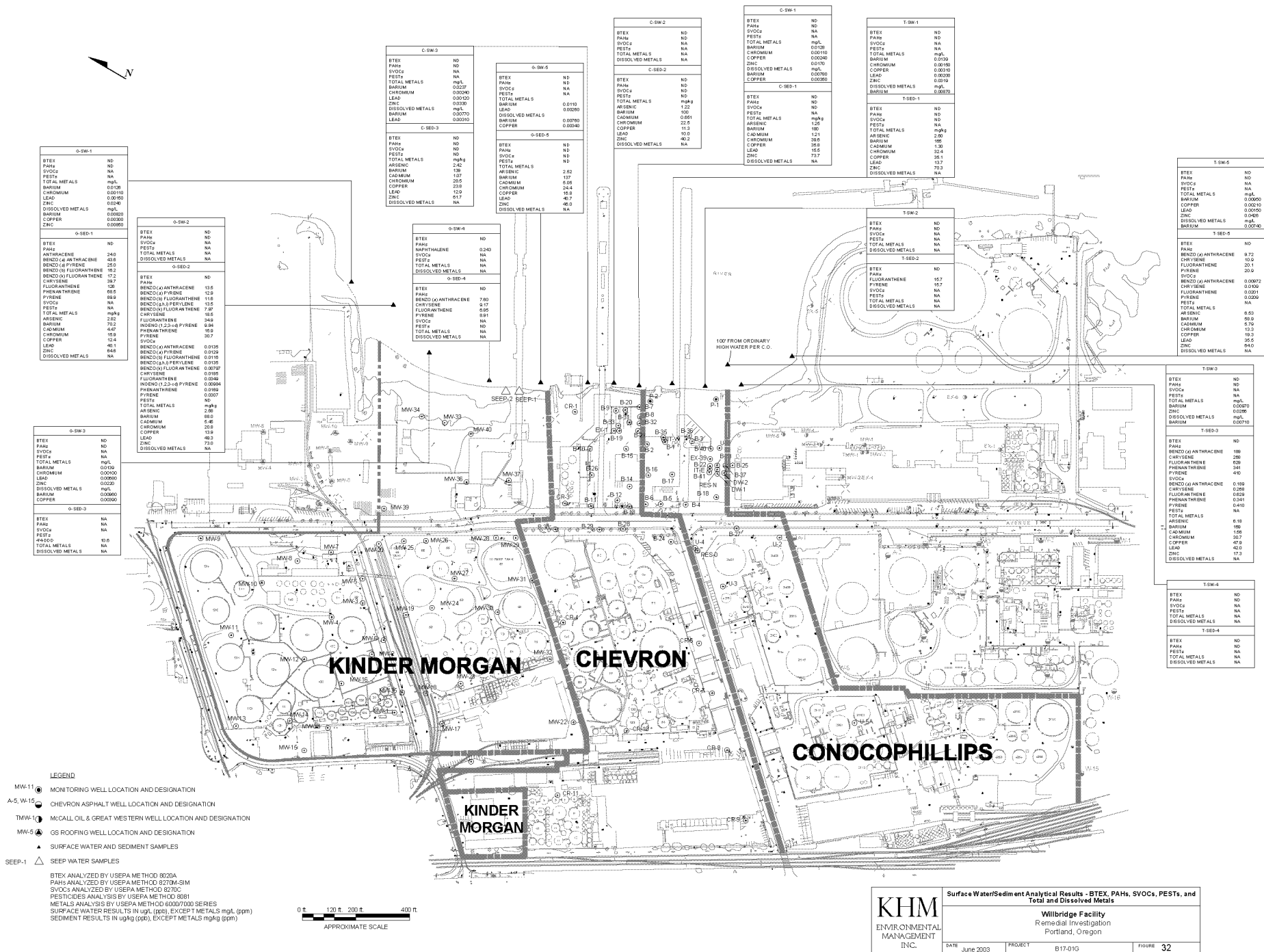
0 ft 120 ft 200 ft 400 ft  
APPROXIMATE SCALE

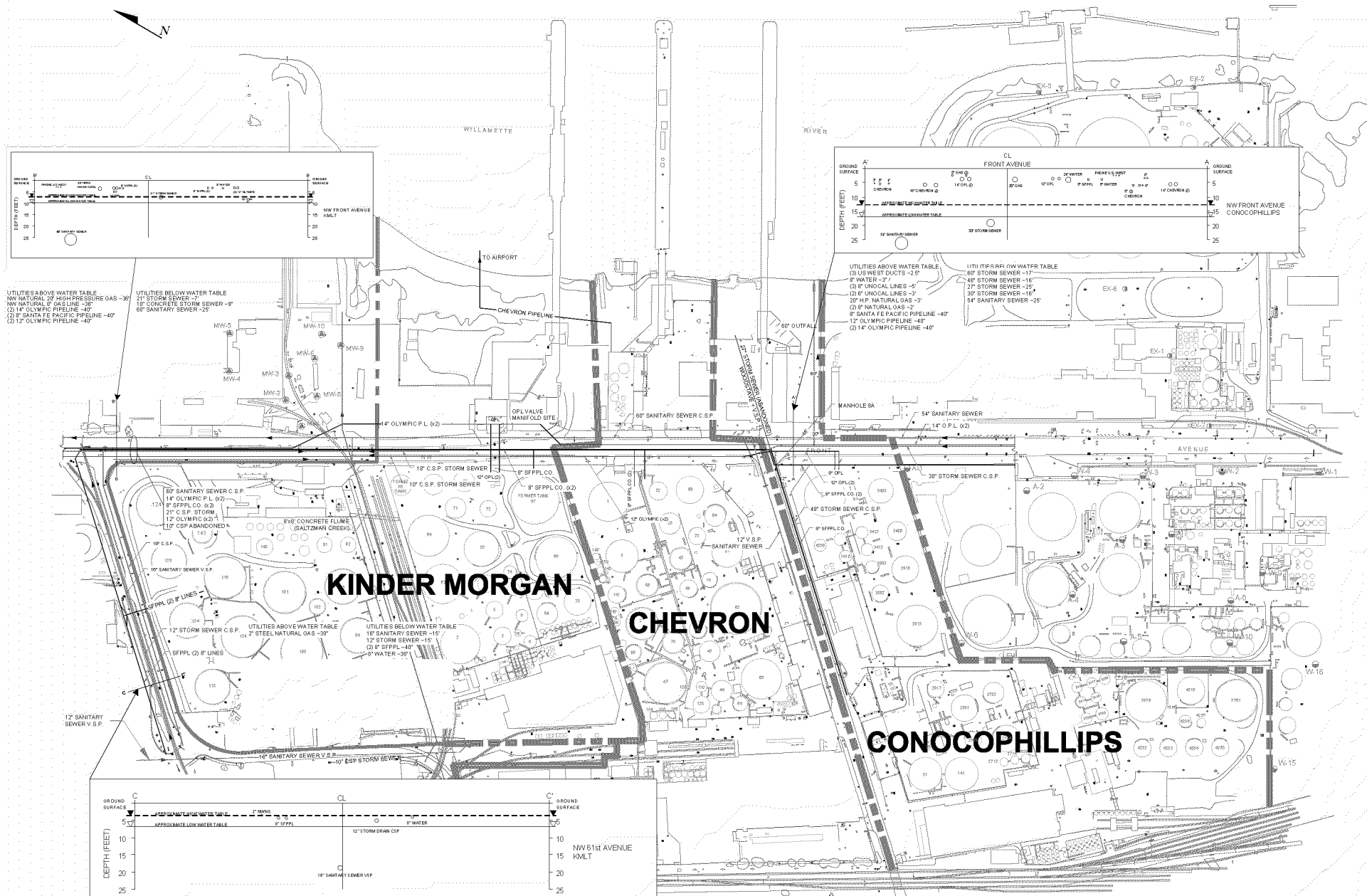
**KHM**  
ENVIRONMENTAL  
MANAGEMENT  
INC.

TITLE Utility Borings - Groundwater Analytical Results - BTEX, VOCs, PAHs, SVOCs, Metals, and Pesticides - March-April 1999

Willbridge Facility  
Remedial Investigation  
Portland, Oregon

DATE June 2003 PROJECT B17-01G FIGURE 28





0 ft 120 ft 200 ft 400 ft  
APPROXIMATE SCALE

<b>KHM</b> ENVIRONMENTAL MANAGEMENT INC.	Remedial Investigation Utility Map		
	Willbridge Facility Remedial Investigation Portland, Oregon		
DATE	June 2003	PROJECT	B17-01G
FIGURE	45		

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**APPENDIX A**  
**GAUGING DATA**

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Products Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-7</b>	2/14/2000	18.33	NP	-	17.40	0.1
(35.73)	5/22/2000	18.60	NP	-	17.13	NA
	8/22/2000	19.31	19.30	0.01	16.43	0.1
	11/27/2000	19.47	sheen	-	16.26	NA
	2/20/2001	19.37	NP	-	16.36	NA
	5/15/2001	19.36	sheen	-	16.37	NA
	9/19/2001	19.74	NP	-	15.99	NA
	12/20/2001	18.30	NP	-	17.43	NA
	3/15/2002	18.28	NP	-	17.45	NA
<b>B-9</b>	2/14/2000	16.29	16.20	0.09	19.35	0.0
(35.57)	5/22/2000	16.90	NP	-	18.67	NA
	8/22/2000	17.48	NP	-	18.09	NA
	11/27/2000	17.29	NP	-	18.28	NA
	2/20/2001	17.41	NP	-	18.16	NA
	5/15/2001	17.04	NP	-	18.53	NA
	9/19/2001	17.84	NP	-	17.73	NA
	12/20/2001	15.92	NP	-	19.65	NA
	3/5/2002	15.92	NP	-	19.65	NA
<b>B-10</b>	2/14/2000	15.10	NP	-	19.66	NA
(34.76)	5/22/2000	15.67	NP	-	19.09	NA
	8/22/2000	16.35	NP	-	18.41	NA
	11/27/2000	16.64	NP	-	18.12	NA
	2/20/2001	16.41	NP	-	18.35	NA
	5/15/2001	16.42	NP	-	18.34	NA
	9/19/2001	16.95	NP	-	17.81	NA
	12/20/2001	15.42	NP	-	19.34	NA
	3/15/2002	14.99	NP	-	19.77	NA
<b>B-11</b>	2/14/2000	14.93	NP	-	20.03	NA
(34.96)	5/22/2000	15.41	NP	-	19.55	NA
	8/22/2000	16.14	NP	-	18.82	NA
	11/27/2000	16.57	NP	-	18.39	0.1
	2/20/2001	16.30	sheen	-	18.66	NA
	5/15/2001	16.30	NP	-	18.66	NA
	9/19/2001	16.82	NP	-	18.14	NA
	12/20/2001	15.44	NP	-	19.52	NA
	3/15/2002	14.80	NP	-	20.16	NA



**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Products Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-12</b>	2/14/2000	15.38	NP	-	19.76	NA
(35 14)	5/22/2000	15.85	NP	-	19.29	NA
	8/22/2000	16.55	NP	-	18.59	NA
	11/27/2000	16.98	NP	-	18.16	NA
	2/20/2001	16.73	NP	-	18.41	NA
	5/15/2001	16.72	NP	-	18.42	NA
	9/19/2001	17.20	NP	-	17.94	NA
	12/20/2001	15.94	NP	-	19.20	NA
	3/15/2002	15.32	NP	-	19.82	NA
<b>B-13</b>	2/14/2000	15.46	NP	-	19.30	NA
(34 76)	5/22/2000	15.86	NP	-	18.90	NA
	8/22/2000	16.46	NP	-	18.30	NA
	11/27/2000	19.91	NP	-	14.85	NA
	2/20/2001	16.65	NP	-	18.11	NA
	5/15/2001	16.65	NP	-	18.11	NA
	9/19/2001	17.09	NP	-	17.67	NA
	12/22/2001	15.94	NP	-	18.82	NA
	3/15/2002	15.37	NP	-	19.39	NA
<b>B-14</b>	2/14/2000	17.27	NP	-	19.32	NA
(36 59)	5/22/2000	17.69	NP	-	18.90	NA
	8/22/2000	18.31	NP	-	18.28	NA
	11/27/2000	18.72	NP	-	17.87	NA
	2/20/2001	18.50	NP	-	18.09	NA
	5/15/2001	18.49	NP	-	18.10	NA
	9/19/2001	18.87	NP	-	17.72	NA
	12/22/2001	17.74	NP	-	18.85	NA
	3/15/2002	17.21	NP	-	19.38	NA
<b>B-15</b>	2/14/2000	16.48	NP	-	19.07	NA
(35 55)	5/22/2000	16.88	NP	-	18.67	NA
	8/22/2000	17.53	NP	-	18.02	NA
	11/27/2000	17.89	NP	-	17.66	NA
	2/20/2001	17.38	NP	-	18.17	NA
	5/15/2001	17.66	NP	-	17.89	NA
	9/19/2001	18.12	NP	-	17.43	NA
	12/20/2001	16.92	NP	-	18.63	NA
	3/15/2002	16.36	NP	-	19.19	NA
<b>B-19</b>	2/14/2000	15.99	NP	-	18.18	NA
(34 17)	5/22/2000	16.34	NP	-	17.83	NA
	8/22/2000	17.04	NP	-	17.13	NA
	11/27/2000	17.35	NP	-	16.82	NA
	2/20/2001	17.17	NP	-	17.00	NA
	5/15/2001	17.14	NP	-	17.03	NA
	9/19/2001	17.67	NP	-	16.50	NA
	12/20/2001	16.32	NP	-	17.85	NA
	3/15/2002	15.88	NP	-	18.29	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Products Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-20</b>	2/14/2000	16.62	NP	-	16.70	NA
(33.32)	5/22/2000	16.93	NP	-	16.39	NA
	8/22/2000	17.78	NP	-	15.54	NA
	11/27/2000	17.99	sheen	-	15.33	NA
	2/20/2001	17.79	sheen	-	15.53	NA
	5/15/2001	17.89	NP	-	15.43	NA
	9/19/2001	18.40	NP	-	14.92	NA
	12/20/2001	16.61	NP	-	16.71	NA
	3/15/2002	16.45	NP	-	16.87	NA
<b>B-21</b>	2/14/2000	16.22	NP	-	18.57	NA
(34.79)	5/22/2000	16.57	NP	-	18.22	NA
	8/22/2000	17.15	NP	-	17.64	NA
	11/27/2000	17.45	NP	-	17.34	NA
	2/20/2001	19.29	NP	-	15.50	NA
	5/15/2001	17.27	NP	-	17.52	NA
	9/19/2001	17.66	NP	-	17.13	NA
	12/20/2001	16.48	NP	-	18.31	NA
	3/15/2002	16.18	NP	-	18.61	NA
<b>B-24</b>	2/14/2000	15.50	15.49	0.01	19.21	0.0
(34.70)	5/22/2000	15.83	NP	-	18.87	NA
	8/22/2000	16.38	NP	-	18.32	NA
	11/27/2000	16.81	NP	-	17.89	NA
	2/20/2001	16.59	NP	-	18.11	NA
	5/15/2001	16.56	NP	-	18.14	NA
	9/19/2001	16.94	NP	-	17.76	NA
	12/22/2001	16.23	16.07	0.16	18.60	0.0
	3/15/2002	15.54	Sheen	-	19.16	0.0
<b>B-26</b>	2/14/2000	15.49	NP	-	19.81	NA
(35.30)	5/22/2000	15.96	NP	-	19.34	NA
	8/22/2000	16.72	NP	-	18.58	NA
	11/27/2000	17.11	NP	-	18.19	NA
	2/20/2001	16.86	NP	-	18.44	NA
	5/15/2001	16.86	NP	-	18.44	NA
	9/19/2001	17.37	NP	-	17.93	NA
	12/20/2001	15.93	NP	-	19.37	NA
	3/15/2002	15.41	NP	-	19.89	NA
<b>B-28</b>	2/14/2000	15.45	NP	-	19.81	NA
(35.26)	5/22/2000	14.34	NP	-	20.92	NA
	8/22/2000	16.11	NP	-	19.15	NA
	11/27/2000	16.36	NP	-	18.90	NA
	2/20/2001	16.14	NP	-	19.12	NA
	5/15/2001	16.07	NP	-	19.19	NA
	9/19/2001	16.25	NP	-	19.01	NA
	12/22/2001	15.97	NP	-	19.29	NA
	3/15/2002	15.36	NP	-	19.90	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Products Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-29</b>	2/14/2000	15.12	NP	-	22.58	NA
(37.70)	5/22/2000	15.43	NP	-	22.27	NA
	8/22/2000	16.24	NP	-	21.46	NA
	11/27/2000	16.63	NP	-	21.07	NA
	2/20/2001	16.27	NP	-	21.43	NA
	5/15/2001	16.22	NP	-	21.48	NA
	9/19/2001	16.80	NP	-	20.90	NA
	12/22/2001	15.68	NP	-	22.02	NA
	3/15/2002	14.98	NP	-	22.72	NA
<b>B-30</b>	2/14/2000	14.76	NP	-	20.63	NA
(35.39)	5/22/2000	15.85	NP	-	19.54	NA
	8/22/2000	16.08	NP	-	19.31	NA
	11/27/2000	16.37	NP	-	19.02	NA
	2/20/2001	15.92	NP	-	19.47	NA
	5/15/2001	15.95	NP	-	19.44	NA
	9/19/2001	16.52	NP	-	18.87	NA
	12/22/2001	14.96	NP	-	20.43	NA
	3/15/2002	14.96	NP	-	20.43	NA
<b>B-32</b>	2/14/2000	16.37	NP	-	17.86	NA
(34.23)	5/22/2000	26.84	NP	-	7.39	NA
	8/22/2000	17.65	NP	-	16.58	NA
	11/27/2000	17.93	NP	-	16.30	NA
	2/20/2001	17.71	NP	-	16.52	NA
	5/15/2001	17.74	NP	-	16.49	NA
	9/19/2001	18.17	NP	-	16.06	NA
	12/20/2001	16.74	NP	-	17.49	NA
	3/15/2002	16.55	NP	-	17.68	NA
<b>B-33</b>	2/14/2000	15.54	15.49	0.05	20.40	0.0
(35.90)	5/22/2000	16.41	NP	-	19.49	NA
	8/22/2000	17.15	NP	-	18.75	NA
	11/27/2000	17.39	NP	-	18.51	NA
	2/20/2001	17.25	NP	-	18.65	NA
	5/15/2001	17.24	NP	-	18.66	NA
	9/19/2001	17.72	NP	-	18.18	NA
	12/20/2001	16.29	NP	-	19.61	NA
	3/15/2002	15.93	NP	-	19.97	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Products Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-1</b> (22 08)	2/14/2000	2 38	NP	-	19 70	NA
	5/22/2000	3 26	NP	-	18 82	NA
	8/22/2000	4 32	NP	-	17 76	NA
	11/27/2000	4 38	NP	-	17 70	NA
	2/20/2001	6 50	NP	-	15 58	NA
	5/15/2001	4 25	NP	-	17 83	NA
	9/19/2001	4 79	NP	-	17 29	NA
	12/22/2001	3 05	NP	-	19 03	NA
	3/15/2002	2 77	NP	-	19 31	NA
<b>CR-3</b> (34 32)	2/14/2000	12 29	12 28	0 01	22 04	0 0
	5/22/2000	16 57	NP	-	17 75	NA
	8/22/2000	15 34	NP	-	18 98	NA
	11/27/2000	13 86	NP	-	20 46	NA
	2/20/2001	15 46	NP	-	18 86	NA
	5/15/2001	15 37	NP	-	18 95	NA
	9/19/2001	16 03	NP	-	18 29	NA
	12/22/2001	14 50	NP	-	19 82	NA
	3/15/2002	13 93	NP	-	20 39	NA
<b>CR-4</b> (37 14)	2/14/2000	5 08	NP	-	32 06	NA
	5/22/2000	5 63	NP	-	31 51	NA
	8/22/2000	7 25	NP	-	29 89	NA
	11/27/2000	8 31	NP	-	28 83	NA
	2/20/2001	6 98	NP	-	30 16	NA
	5/15/2001	6 34	NP	-	30 80	NA
	9/19/2001	8 55	NP	-	28 59	NA
	12/20/2001	5 38	NP	-	31 76	NA
	3/15/2002	4 88	NP	-	32 26	NA
<b>CR-6</b> (35 61)	2/14/2000	11 75	NP	-	23 86	NA
	5/22/2000	12 20	NP	-	23 41	NA
	8/22/2000	13 11	NP	-	22 50	NA
	11/27/2000	NM	NM	-	-	NA
	2/20/2001	13 12	13 11	0 01	22 50	0.0 **
	5/15/2001	12 90	NP	-	22 71	NA **
	9/19/2001	13 95	13 91	0 04	21 69	0.0 **
	12/20/2001	13 02	NP	-	22 59	NA
	3/15/2002	11 54	NP	-	24 07	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Products Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-7</b>	2/14/2000	9.46	9.45	0.01	26.12	0.0
(35.57)	5/22/2000	10.09	NP	-	25.48	NA
	8/22/2000	16.34	NP	-	19.23	NA
	11/27/2000	NM	NM	-	NM	-
	2/20/2001	11.30	sheen	-	24.27	0.0
	5/15/2001	11.21	NP	-	24.36	NA
	9/19/2001	12.46	NP	-	23.11	NA
	12/20/2001	9.92	NP	-	25.65	NA
	3/15/2002	9.60	NP	-	25.97	NA
<b>CR-8</b>	2/14/2000	5.70	NP	-	27.44	NA
(33.14)	5/22/2000	6.23	NP	-	26.91	NA
	8/22/2000	7.44	NP	-	25.70	NA
	11/27/2000	7.61	NP	-	25.53	NA
	2/20/2001	7.03	NP	-	26.11	NA
	5/15/2001	6.98	NP	-	26.16	NA
	9/19/2001	8.29	NP	-	24.85	NA
	12/20/2001	6.18	NP	-	26.96	NA
	3/15/2002	5.77	NP	-	27.37	NA
<b>CR-9</b>	2/14/2000	3.02	NP	-	32.70	NA
(35.72)	5/22/2000	3.78	NP	-	31.94	NA
	8/22/2000	6.51	NP	-	29.21	NA
	11/27/2000	5.20	NP	-	30.52	NA
	2/20/2001	4.71	NP	-	31.01	NA
	5/15/2001	4.95	NP	-	30.77	NA
	9/19/2001	7.26	NP	-	28.46	NA
	12/20/2001	3.47	NP	-	32.25	NA
	3/15/2002	3.25	NP	-	32.47	NA
<b>CR-10</b>	2/14/2000	4.12	4.08	0.04	31.48	0.0
(35.57)	5/22/2000	4.95	NP	-	30.62	NA
	8/22/2000	7.00	6.74	0.26	28.78	0.9
	11/27/2000	NM	NM	-	-	1.1
	2/20/2001	6.27	6.03	0.24	29.49	0.5
	5/15/2001		Covered With a Gravel Pile			0.5
	9/19/2001	10.68	7.92	2.76	27.10	NR ***
	12/22/2001	4.18	4.12	0.06	31.44	NR ***
	3/15/2002	4.03	3.95	0.08	31.60	0.1
<b>CR-11</b>	2/14/2000	2.06	NP	-	32.37	NA
(34.43)	5/22/2000	2.04	NP	-	32.39	NA
	8/22/2000	4.13	NP	-	30.30	NA
	11/27/2000	4.47	sheen	-	29.96	0.1
	2/20/2001	3.27	NP	-	31.16	NA
	5/15/2001	3.02	NP	-	31.41	NA
	9/19/2001	5.26	NP	-	29.17	NA
	12/20/2001	2.34	NP	-	32.09	NA
	3/15/2002	2.02	NP	-	32.41	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Products Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-12</b> (35.59)	6/9/1999	4.85	NP	-	30.74	NA
	7/8/1999	5.08	NP	-	30.51	NA
	8/16/1999	5.63	NP	-	29.96	NA
	9/20/1999	8.90	NP	-	26.69	NA
	2/9/2000	2.66	NP	-	32.93	NA
	5/9/2000	4.44	NP	-	31.15	NA
	5/15/2000	4.12	NP	-	31.47	NA
	7/11/2000	5.21	NP	-	30.38	NA
	8/14/2000	5.76	NP	-	29.83	NA
	12/12/2000	5.61	NP	-	29.98	NA
	4/3/2001	5.49	NP	-	30.10	NA
	6/8/2001	Covered With a Gravel Pile				
	7/16/2001	Covered With a Gravel Pile				
	8/1/2001	6.14	NP	-	29.45	NA
	9/19/2001	Covered With a Gravel Pile				
	12/22/2001	3.82	NP	-	31.77	NA
	3/15/2002	3.89	NP	-	31.70	NA
<b>CR-13</b> (35.46)	6/9/1999	5.08	NP	-	30.38	NA
	7/8/1999	5.27	NP	-	30.19	NA
	8/16/1999	5.77	NP	-	29.69	NA
	9/20/1999	9.05	NP	-	26.41	NA
	2/9/2000	3.86	NP	-	31.60	NA
	5/9/2000	4.63	NP	-	30.83	NA
	5/15/2000	4.37	NP	-	31.09	NA
	7/11/2000	5.28	NP	-	30.18	NA
	8/14/2000	5.81	NP	-	29.65	NA
	12/12/2000	5.64	NP	-	29.82	NA
	4/3/2001	5.80	NP	-	29.66	NA
	6/8/2001	5.75	NP	-	29.71	NA
	7/16/2001	6.29	NP	-	29.17	NA
	8/1/2001	6.52	NP	-	28.94	NA
	9/19/2001	Covered With a Gravel Pile				
	12/22/2001	4.34	NP	-	31.12	NA
	3/15/2002	4.38	NP	-	31.08	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Products Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-14</b>	6/9/1999	5.03	NP	-	30.40	NA
(35.43)	7/8/1999	5.27	NP	-	30.16	NA
	8/16/1999	5.85	NP	-	29.58	NA
	9/20/1999	6.14	NP	-	29.29	NA
	2/9/2000	3.98	NP	-	31.45	NA
	5/9/2000	4.66	NP	-	30.77	NA
	5/15/2000	4.33	NP	-	31.10	NA
	7/11/2000	5.41	NP	-	30.02	NA
	8/14/2000	6.01	NP	-	29.42	NA
	12/12/2000	5.87	NP	-	29.56	NA
	4/3/2001	5.70	NP	-	29.73	NA
	6/8/2001	5.81	NP	-	29.62	NA
	7/16/2001	6.20	NP	-	29.23	NA
	8/1/2001	6.32	NP	-	29.11	NA
	9/19/2001	6.99	NP	-	28.44	NA
	12/20/2001	4.22	NP	-	31.21	NA
	3/15/2002	4.09	NP	-	31.34	NA
<b>CR-15</b>	6/9/1999	9.06	NP	-	26.36	NA
(35.42)	7/8/1999	9.44	9.41	0.03	26.00	NR ***
	8/16/1999	10.35	10.08	0.27	25.29	NR ***
	9/20/1999	11.07	10.63	0.44	24.70	NR ***
	2/9/2000	8.32	8.01	0.31	27.35	NR ***
	5/9/2000	8.91	8.66	0.25	26.71	NR ***
	5/15/2000	8.74	8.53	0.21	26.85	NR ***
	5/16/2000	8.60	8.45	0.15	26.94	NR ***
	6/7/2000	9.33	8.99	0.34	26.36	NR ***
	7/11/2000	10.02	9.70	0.32	25.66	NR ***
	8/14/2000	10.76	10.39	0.37	24.96	NR ***
	12/12/2000	10.60	10.56	0.04	24.85	NR ***
	4/3/2001	10.17	10.05	0.12	25.35	NR ***
	6/8/2001	10.56	10.37	0.19	25.01	NR ***
	7/16/2001	10.97	10.77	0.20	24.61	NR ***
	9/19/2001	12.17	11.76	0.41	23.58	NR ***
	12/22/2001	8.66	8.50	0.16	26.89	NR ***
	3/15/2002	8.86	8.42	0.44	26.91	0.3

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Products Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-16</b> (34 77)	6/9/1999	11 05	NP	-	23.72	NA
	7/8/1999	11 61	NP	-	23 16	NA
	8/16/1999	11.82	NP	-	22.95	NA
	9/20/1999	12 00	NP	-	22.77	NA
	2/9/2000	10 39	NP	-	24.38	NA
	5/9/2000	11 10	NP	-	23.67	NA
	5/15/2000	11.12	NP	-	23.65	NA
	7/11/2000	11 86	NP	-	22.91	NA
	8/14/2000	11 96	NP	-	22.81	NA
	12/12/2000	11 95	NP	-	22.82	NA
	4/3/2001	11 93	NP	-	22.84	NA
	6/8/2001	NM	NM	-	NM	-
	7/16/2001	12 06	NP	-	22.71	NA
	9/19/2001	12.60	NP	-	22.17	NA
	12/22/2001	10 40	NP	-	24.37	NA
	3/15/2002	10.64	NP	-	24.13	NA
<b>CR-17</b> (34 46)	6/9/1999	6 90	NP	-	27.56	NA
	7/8/1999	7 15	NP	-	27.31	NA
	8/16/1999	7 81	NP	-	26.65	NA
	9/20/1999	8.35	NP	-	26.11	NA
	2/9/2000	6 41	NP	-	28.05	NA
	5/9/2000	6 80	NP	-	27.66	NA
	5/15/2000	6 68	NP	-	27.78	NA
	7/11/2000	7 50	NP	-	26.96	NA
	8/14/2000	8 21	NP	-	26.25	NA
	12/12/2000	8 26	NP	-	26.20	NA
	4/3/2001	7 90	NP	-	26.56	NA
	6/8/2001	NM	NM	-	NM	-
	7/16/2001	8.59	NP	-	25.87	NA
	9/19/2001	9.70	NP	-	24.76	NA
	12/22/2001	6 57	NP	-	27.89	NA
	3/15/2002	6.47	NP	-	27.99	NA



**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Products Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-18</b> (34 84)	6/9/1999	3 77	NP	-	31 07	NA
	7/8/1999	4 14	NP	-	30 70	NA
	8/16/1999	5 19	NP	-	29 65	NA
	9/20/1999	NM	NM	-	NM	-
	2/9/2000	NM	NM	-	NM	-
	5/9/2000	NM	NM	-	NM	-
	5/15/2000	NM	NM	-	NM	-
	7/11/2000	NM	NM	-	NM	-
	8/14/2000	NM	NM	-	NM	-
	12/12/2000	NM	NM	-	NM	-
	4/3/2001	NM	NM	-	NM	-
	6/8/2001	NM	NM	-	NM	-
	7/16/2001	NM	NM	-	NM	-
	9/19/2001	NM	NM	-	NM	-
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	NM	NM	-	NM	-
<b>CR-19</b> (35 49)	6/9/1999	5 10	NP	-	30 39	NA
	7/8/1999	6 24	5 27	0.97	30 03	NR ***
	8/16/1999	7 65	5 87	1 78	29 26	NR ***
	9/20/1999	8 86	6 38	2 48	28 61	NR ***
	2/9/2000	5 94	3 35	2 59	31 62	NR ***
	5/9/2000	6 19	4 38	1 81	30 75	NR ***
	5/15/2000	4 27	4 22	0 05	31 26	NR ***
	5/16/2000	4 32	4 26	0 06	31 22	NR ***
	6/7/2000	5 57	4 78	0 79	30 55	NR ***
	7/11/2000	6 17	5 35	0 82	29 98	NR ***
	8/14/2000	7 50	5 94	1 56	29 24	NR ***
	12/12/2000	8 69	5 90	2 79	29 03	NR ***
	4/3/2001	8 03	5 61	2 42	29 40	NR ***
	6/8/2001	7 77	5 75	2 02	29 34	NR ***
	7/16/2001	7 99	6 32	1 67	28 84	NR ***
	9/19/2001	8 86	7 14	1 72	28 01	NR ***
	12/22/2001	4 62	4 24	0 38	31 17	NR ***
	3/15/2002	4 47	4 13	0 34	31 29	0.3

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Products Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-20</b>	7/8/1999	7.69	NP	-	27.45	NA
(35.14)	8/16/1999	8.50	NP	-	26.64	NA
	9/20/1999	9.14	NP	-	26.00	NA
	2/9/2000	6.67	NP	-	28.47	NA
	5/9/2000	7.25	NP	-	27.89	NA
	5/15/2000	6.98	NP	-	28.16	NA
	7/11/2000	8.15	NP	-	26.99	NA
	8/14/2000	8.95	NP	-	26.19	NA
	12/12/2000	9.12	NP	-	26.02	NA
	4/3/2001	8.75	NP	-	26.39	NA
	6/8/2001	9.04	NP	-	26.10	NA
	7/16/2001	9.51	NP	-	25.63	NA
	9/19/2001	10.91	NP	-	24.23	NA
	12/20/2001	6.96	NP	-	28.18	NA
	3/15/2002	6.91	NP	-	28.23	NA
<b>CR-21A</b>	12/12/2000	5.54	NP	-	28.57	NA
(34.11)	4/5/2001	5.21	5.11	0.10	28.98	NR ***
	6/8/2001	5.61	5.11	0.50	28.90	NR ***
	7/16/2001	6.37	5.25	1.12	28.64	NR ***
	9/19/2001	Covered With Construction Equipment				
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	NM	NM	>1.0E	NM	NM
<b>CR-21B</b>	12/12/2000	6.53	NP	-	27.83	NA
(34.36)	4/3/2001	5.62	NP	-	28.74	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	6.88	NP	-	27.48	NA
	9/19/2001	7.41	NP	-	26.95	NA
	12/20/2001	4.68	NP	-	29.68	NA
	3/15/2002	4.48	NP	-	29.88	NA
<b>CR-22A</b>	12/12/2000	11.92	NP	-	22.88	NA
(34.80)	4/3/2001	11.51	NP	-	23.29	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	11.89	NP	-	22.91	NA
	9/19/2001	12.52	NP	-	22.28	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	10.36	NP	-	24.44	NA
<b>CR-22B</b>	12/12/2000	11.27	NP	-	23.92	NA
(35.19)	4/3/2001	10.70	NP	-	24.49	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	11.31	NP	-	23.88	NA
	9/19/2001	12.02	NP	-	23.17	NA
	12/20/2001	9.63	NP	-	25.56	NA
	3/15/2002	9.52	NP	-	25.67	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Products Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-23A</b>	12/12/2000	13.56	NP	-	22.79	NA
(36.35)	4/3/2001	13.20	NP	-	23.15	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	13.52	NP	-	22.83	NA
	9/19/2001	14.19	NP	-	22.16	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	11.84	NP	-	24.51	NA
<b>CR-23B</b>	12/12/2000	12.57	NP	-	23.70	NA
(36.27)	4/3/2001	12.18	NP	-	24.09	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	12.71	NP	-	23.56	NA
	9/19/2001	13.79	NP	-	22.48	NA
	12/20/2001	11.04	NP	-	25.23	NA
	3/15/2002	10.94	NP	-	25.33	NA
<b>CR-24A</b>	12/12/2000	15.15	NP	-	21.06	NA
(36.21)	4/3/2001	14.46	NP	-	21.75	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	14.64	NP	-	21.57	NA
	9/19/2001	15.11	NP	-	21.10	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	13.29	NP	-	22.92	NA
<b>CR-24B</b>	12/12/2000	13.78	NP	-	22.54	NA
(36.32)	4/3/2001	13.40	NP	-	22.92	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	13.77	NP	-	22.55	NA
	9/19/2001	14.44	NP	-	21.88	NA
	12/20/2001	12.41	NP	-	23.91	NA
	3/15/2002	12.06	NP	-	24.26	NA
<b>CR-25</b>	12/12/2000	8.23	NP	-	26.04	NA
(34.27)	4/3/2001	7.69	7.25	0.44	26.93	NR ***
	6/8/2001	7.49	7.15	0.34	27.05	NR ***
	7/16/2001	8.67	7.73	0.94	26.35	NR ***
	9/19/2001	9.02	8.75	0.27	25.47	NR ***
	12/20/2001	6.96	6.81	0.15	27.43	NR ***
	3/15/2002	6.66	6.51	0.15	27.73	0.1
<b>GPW-1</b>	12/12/2000	12.99	NP	-	21.67	NA
(34.66)	2/20/2001	12.59	NP	-	22.07	NA
	4/3/2001	12.56	NP	-	22.10	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	12.70	NP	-	21.96	NA
	9/19/2001	13.15	NP	-	21.51	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	7.46	NP	-	27.20	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Products Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>GPW-2</b> (34 98)	12/12/2000	NM	NM	NM	NM	-
	2/20/2001	10 93	10 68	-	24 05	NA
	4/3/2001	NM	NM	NM	NM	-
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	NM	NM	NM	NM	-
	9/19/2001	12.91	NP	-	22 07	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	7 91	NP	-	27 07	NA
<b>GPW-3</b> (35 08)	12/12/2000	12 23	NP	-	22.85	NA
	2/20/2001	12.03	NP	-	23 05	NA
	4/3/2001	11.97	NP	-	23 11	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	12 16	NP	-	22 92	NA
	9/19/2001	12 66	NP	-	22 42	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	10 46	NP	-	24 62	NA
<b>GPW-4</b> (35 07)	12/12/2000	NM	NM	NM	NM	-
	2/20/2001	12.29	NP	-	22.78	NA
	4/3/2001	NM	NM	NM	NM	-
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	NM	NM	NM	NM	-
	9/19/2001	13 02	NP	-	22 05	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	11 08	NP	-	23 99	NA
<b>GPW-5</b> (34 85)	12/12/2000	NM	NM	NM	NM	-
	2/20/2001	12 02	NP	-	22 83	NA
	4/3/2001	NM	NM	NM	NM	-
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	NM	NM	NM	NM	-
	9/19/2001	12 79	NP	-	22 06	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	10.72	NP	-	24.13	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Products Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
EX-1	2/14/2000	15.55	NP	-	18.60	NA
(34.15)	5/22/2000	18.29	NP	-	15.86	NA
	8/22/2000	16.56	NP	-	17.59	NA
	11/27/2000	16.86	NP	-	17.29	NA
	2/20/2001	16.66	NP	-	17.49	NA
	5/15/2001	16.62	NP	-	17.53	NA
	9/19/2001		Covered by Facility Equipment			
	12/22/2001		Covered by Facility Equipment			
	3/15/2002	15.34	NP	-	18.81	NA
<b>NOTES:</b> Wells B-8 and B-31 were abandoned after first quarter 2000 NP = No measurable product NA = Not Applicable NM = Not Measured NR = None Recovered * = SPH Recovered for latest quarter monitored ** = Well Contains a Sock for Product Recovery *** = Product Recovery Part of Chevron Ethanol Study E = 3/4 inch-diameter well/ SPH thickness estimated with bailer - = No measurable product thickness Groundwater elevations for wells with product thicknesses have been corrected using 0.8 GWE = TOC - (DTW - (0.8 x DTP - DTW)) Where 0.8 = The density of the SPH						

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Elevation	SPH Recovered* (gallons)
<b>MW-1</b> (35 43)	2/14/2000	3.76	NP	-	31.67	NA
	5/22/2000	4.72	NP	-	30.71	NA
	8/23/2000	7.52	NP	-	27.91	NA
	11/28/2000	7.43	NP	-	28.00	NA
	2/21/2001	6.32	NP	-	29.11	NA
	5/15/2001	6.33	NP	-	29.10	NA
	9/19/2001	8.40	NP	-	27.03	NA
	12/19/2001	3.92	NP	-	31.51	NA
	3/13/2002	3.80	NP	-	31.63	NA
<b>MW-2</b> (35 77)	2/14/2000	5.59	NP	-	30.18	NA
	5/22/2000	6.74	NP	-	29.03	NA
	8/23/2000	8.44	NP	-	27.33	NA
	11/28/2000	9.15	NP	-	26.62	NA
	2/21/2001	8.29	NP	-	27.48	NA
	5/15/2001	8.11	NP	-	27.66	NA
	9/19/2001	9.93	NP	-	25.84	NA
	12/19/2001	6.02	NP	-	29.75	NA
	3/13/2002	5.51	NP	-	30.26	NA
<b>MW-3</b> (36 02)	2/14/2000	7.02	NP	-	29.00	NA
	5/22/2000	8.04	NP	-	27.98	NA
	8/23/2000	9.58	NP	-	26.44	NA
	11/28/2000	10.22	NP	-	25.80	NA
	2/21/2001	9.49	NP	-	26.53	NA
	5/15/2001	9.33	NP	-	26.69	NA
	9/19/2001	10.96	NP	-	25.06	NA
	12/19/2001	7.55	NP	-	28.47	NA
	3/13/2002	7.10	NP	-	28.92	NA
<b>MW-4</b> (36 39)	2/14/2000	6.36	NP	-	30.03	NA
	5/22/2000	7.54	NP	-	28.85	NA
	8/23/2000	9.18	NP	-	27.21	NA
	11/28/2000	9.83	NP	-	26.56	NA
	2/21/2001	9.07	NP	-	27.32	NA
	5/15/2001	8.93	NP	-	27.46	NA
	9/19/2001	10.59	NP	-	25.80	NA
	12/19/2001	6.98	NP	-	29.41	NA
	3/13/2002	6.42	NP	-	29.97	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-5</b> (33 52)	2/14/2000	6 02	NP	-	27 50	NA
	5/22/2000	6 64	NP	-	26 88	NA
	8/23/2000	8 28	NP	-	25 24	NA
	11/28/2000	5 79	NP	-	27 73	NA
	2/21/2001	8 27	NP	-	25 25	NA
	5/15/2001	6 02	sheen	-	27 50	NA
	9/18/2001	9 77	NP	-	23 75	NA
	12/19/2001	6 39	NP	-	27 13	NA
	3/13/2002	6 09	NP	-	27 43	NA
<b>MW-6</b> (33 34)	2/14/2000	3 72	3 69	0 03	29 64	2 0
	5/22/2000	4 70	NP	-	28 64	NA
	8/23/2000	6 24	NP	-	27 10	NA
	11/28/2000	6 98	NP	-	26 36	0 1
	2/21/2001	6 21	sheen	-	27 13	NA
	5/15/2001	8 10	NP	-	25 24	NA
	9/18/2001	7 71	7 66	0 05	25 67	NA
	12/19/2001	4 05	NP	-	29 29	0 06
	3/13/2002	3 70	sheen	-	29 64	NA
<b>MW-7</b> (34 12)	2/14/2000	8 74	8 54	0 20	25 54	3 7
	5/22/2000	9 95	8 92	1 03	24 99	11
	8/23/2000	NM	NM	-	NA	2
	11/28/2000	10 94	10 35	0 59	23 65	2 2
	2/21/2001	10 37	10 01	0 36	24 04	1 9
	5/15/2001	10 27	10 00	0 27	24 07	1 75
	9/19/2001	11 04	11 00	0 04	23 11	0 8
	12/19/2001	9 05	8 78	0 27	25 29	1 1
	3/13/2002	9 11	8 30	0 81	25 66	3 1
<b>MW-8</b> (33 95)	2/14/2000	7 18	NP	-	26 77	NA
	5/22/2000	8 00	NP	-	25 95	NA
	8/23/2000	9 26	NP	-	24 69	NA
	11/28/2000	9 91	NP	-	24 04	NA
	2/21/2001	9 40	NP	-	24 55	NA
	5/15/2001	9 30	NP	-	24 65	NA
	9/19/2001	10 49	NP	-	23 46	NA
	12/19/2001	8 42	NP	-	25 53	NA
	3/13/2002	7 38	NP	-	26 57	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-9</b> (36 53)	2/14/2000	9 66	NP	-	26 87	NA
	5/22/2000	10 24	NP	-	26 29	NA
	8/23/2000	11 42	NP	-	25 11	NA
	11/28/2000	12 18	NP	-	24 35	NA
	2/21/2001	11 85	NP	-	24 68	NA
	5/15/2001	11 83	NP	-	24 70	NA
	9/19/2001	12 86	NP	-	23 67	NA
	12/19/2001	11 87	NP	-	24 66	NA
	3/13/2002	10 30	NP	-	26 23	NA
<b>MW-10</b> (35 82)	2/14/2000	8 46	NP	-	27 36	NA
	5/22/2000	5 59	NP	-	30 23	NA
	8/23/2000	11 21	NP	-	24 61	NA
	11/28/2000	11 86	NP	-	23 96	NA
	2/21/2001	11 16	NP	-	24 66	NA
	5/15/2001	11 04	NP	-	24 78	NA
	9/19/2001	12 59	NP	-	23 23	NA
	12/19/2001	9 42	NP	-	26 40	NA
	3/13/2002	8 58	NP	-	27 24	NA
<b>MW-11</b> (36 47)	2/14/2000	5 04	NP	-	31 43	NA
	5/22/2000	3 11	NP	-	33 36	NA
	8/23/2000	7 97	NP	-	28 50	NA
	11/28/2000	7 66	NP	-	28 81	NA
	2/21/2001	7 48	NP	-	28 99	NA
	5/15/2001	7 30	NP	-	29 17	NA
	9/19/2001	9 29	NP	-	27 18	NA
	12/19/2001	5 44	NP	-	31 03	NA
	3/13/2002	5 23	NP	-	31 24	NA
<b>MW-12</b> (35 95)	2/14/2000	4 99	NP	-	30 96	NA
	5/22/2000	6 57	NP	-	29 38	NA
	8/23/2000	8 65	NP	-	27 30	NA
	11/28/2000	9 16	NP	-	26 79	NA
	2/21/2001	8 32	NP	-	27 63	NA
	5/15/2001	8 16	NP	-	27 79	NA
	9/19/2001	10 17	NP	-	25 78	NA
	12/19/2001	5 54	NP	-	30 41	NA
	3/13/2002	4 85	NP	-	31 10	NA



**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Elevation	SPH Recovered* (gallons)
<b>MW-13</b> (37 89)	2/14/2000	3 85	NP	-	34 04	NA
	5/22/2000	5 03	NP	-	32 86	NA
	8/23/2000	7 00	NP	-	30 89	NA
	11/28/2000	6 59	NP	-	31 30	NA
	2/21/2001	6 26	NP	-	31 63	NA
	5/15/2001	6 03	NP	-	31 86	NA
	9/19/2001	8 55	NP	-	29 34	NA
	12/19/2001	3 77	NP	-	34 12	NA
	3/13/2002	3 72	NP	-	34 17	NA
<b>MW-14</b> (36 28)	2/14/2000	2 73	NP	-	33 55	NA
	5/22/2000	4 50	NP	-	31 78	NA
	8/23/2000	6 55	NP	-	29 73	NA
	11/28/2000	6 36	NP	-	29 92	NA
	2/21/2001	5 65	NP	-	30 63	NA
	5/15/2001	4 67	NP	-	31 61	NA
	9/19/2001	7 71	NP	-	28 57	NA
	12/19/2001	3 10	NP	-	33 18	NA
	3/13/2002	2 84	NP	-	33 44	NA
<b>MW-15</b> (37 50)	2/14/2000	4 09	NP	-	33 41	NA
	5/22/2000	5 80	NP	-	31 70	NA
	8/23/2000	9 21	NP	-	28 29	NA
	11/28/2000	8 90	NP	-	28 60	NA
	2/21/2001	7 46	NP	-	30 04	NA
	5/15/2001	7 80	NP	-	29 70	NA
	9/18/2001	10 46	NP	-	27 04	NA
	12/19/2001	4 03	NP	-	33 47	NA
	3/13/2002	4 14	NP	-	33 36	NA
<b>MW-16</b> (34 93)	2/14/2000	3 44	NP	-	31 49	NA
	5/22/2000	4 98	NP	-	29 95	NA
	8/23/2000	6 99	NP	-	27 94	NA
	11/28/2000	7 51	NP	-	27 42	NA
	2/21/2001	6 60	NP	-	28 33	NA
	5/15/2001	6 51	NP	-	28 42	NA
	9/19/2001	8 48	NP	-	26 45	NA
	12/19/2001	3 99	NP	-	30 94	NA
	3/13/2002	3 35	NP	-	31 58	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Elevation	SPH Recovered* (gallons)
<b>MW-17</b> (36.05)	2/14/2000	4.22	NP	-	31.83	NA
	5/22/2000	4.70	NP	-	31.35	NA
	8/23/2000	5.91	NP	-	30.14	NA
	11/28/2000	5.82	NP	-	30.23	NA
	2/21/2001	5.46	NP	-	30.59	NA
	5/15/2001	5.26	NP	-	30.79	NA
	9/18/2001	6.84	NP	-	29.21	NA
	12/19/2001	4.67	NP	-	31.38	NA
	3/13/2002	4.17	NP	-	31.88	NA
<b>MW-18</b> (33.76)	2/14/2000	0.87	NP	-	32.89	NA
	5/22/2000	2.15	NP	-	31.61	NA
	8/23/2000	3.62	sheen	-	30.14	NA
	11/28/2000	3.55	NP	-	30.21	0.1
	2/21/2001	3.10	NP	-	30.66	0.1
	5/15/2001	2.83	NP	-	30.93	0.1
	9/18/2001	4.68	4.66	0.02	29.10	NA
	12/19/2001	0.25	NP	-	33.51	NA
	3/13/2002	0.97	sheen	-	32.79	NA
<b>MW-19</b> (33.39)	2/14/2000	2.82	NP	-	30.57	NA
	5/22/2000	4.62	4.59	0.03	28.79	NA
	8/23/2000	5.89	5.88	0.01	27.51	NA
	11/28/2000	5.91	NP	-	27.48	0.3
	2/21/2001	5.03	sheen	-	28.36	0.1
	5/15/2001	4.09	sheen	-	29.30	NA
	9/18/2001	7.27	7.23	0.04	26.15	NA
	12/19/2001	2.72	NP	-	30.67	NA
	3/13/2002	2.84	sheen	-	30.55	NA
<b>MW-20</b> (34.76)	2/14/2000	9.80	NP	-	24.96	NA
	5/22/2000	10.23	NP	-	24.53	NA
	8/23/2000	11.47	NP	-	23.29	NA
	11/28/2000	11.45	NP	-	23.31	NA
	2/21/2001	11.21	NP	-	23.55	NA
	5/15/2001	11.20	NP	-	23.56	NA
	9/18/2001	12.48	NP	-	22.28	NA
	12/19/2001	10.21	NP	-	24.55	NA
	3/13/2002	9.80	NP	-	24.96	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-21</b> (34 33)	2/14/2000	1 26	NP	-	33 07	NA
	5/22/2000	1 62	NP	-	32 71	NA
	8/23/2000	2 38	NP	-	31 95	NA
	11/28/2000	1 80	NP	-	32 53	NA
	2/21/2001	1 64	NP	-	32 69	NA
	5/15/2001	1 59	NP	-	32 74	NA
	9/18/2001	3 01	NP	-	31 32	NA
	12/19/2001	0 27	NP	-	34 06	NA
	3/13/2002	0 99	NP	-	33 34	NA
<b>MW-22</b> (35 65)	2/14/2000	2 85	NP	-	32 80	NA
	5/22/2000	4 28	NP	-	31 37	NA
	8/23/2000	5 52	NP	-	30 13	NA
	11/28/2000	6 50	NP	-	29 15	NA
	2/21/2001	5 57	sheen	-	30 08	NA
	5/15/2001	5 29	5 28	0 01	30 37	NA
	9/19/2001	6 53	NP	-	29 12	NA
	12/19/2001	3 56	NP	-	32 09	NA
	3/13/2002	3 10	sheen	-	32 55	NA
<b>MW-23</b> (36 06)	2/14/2000	3 56	NP	-	32 50	NA
	5/22/2000	5 63	NP	-	30 43	NA
	8/23/2000	5 82	5 82	0 00	30 24	NA
	11/28/2000	5 51	5 51	0 00	30 55	0 1
	2/21/2001	5 33	NP	-	30 73	0 1
	5/15/2001	5 01	sheen	-	31 05	NA
	9/19/2001	6 50	6 49	0 01	29 57	NA
	12/19/2001	4 19	NP	-	31 87	NA
	3/13/2002	3 99	NP	-	32 07	NA
<b>MW-24</b> (35 15)	2/14/2000	5 00	4 50	0 50	30 55	1 0
	5/22/2000	5 34	5 21	0 13	29 91	2 0
	8/23/2000	8 56	NP	-	26 59	NA
	11/28/2000	7 79	NP	-	27 36	0 3
	2/21/2001	7 20	7 15	0 05	27 99	0 4
	5/15/2001	5 45	sheen	-	29 70	0 1
	9/19/2001	9 55	9 54	0 01	25 61	NA
	12/19/2001	5 30	4 84	0 46	30 22	0 1
	3/13/2002	6 78	sheen	-	28 37	0 25

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-25</b>	2/14/2000	10.03	NP	-	24.70	NA
(34.73)	5/22/2000	11.66	NP	-	23.07	NA
	8/23/2000	12.20	NP	-	22.53	NA
	11/28/2000	12.34	NP	-	22.39	NA
	2/21/2001	11.97	NP	-	22.76	NA
	5/15/2001	11.91	NP	-	22.82	NA
	9/19/2001	13.12	NP	-	21.61	NA
	12/19/2001	10.45	NP	-	24.28	NA
	3/13/2002	10.35	NP	-	24.38	NA
<b>MW-26</b>	2/14/2000	10.44	NP	-	24.34	NA
(34.78)	5/22/2000	11.10	NP	-	23.68	NA
	8/23/2000	12.55	NP	-	22.23	NA
	11/28/2000	12.63	NP	-	22.15	NA
	2/21/2001	12.33	sheen	-	22.45	NA
	5/15/2001	12.24	NP	-	22.54	NA
	9/19/2001	13.47	sheen	-	21.31	NA
	12/19/2001	11.04	NP	-	23.74	NA
	3/13/2002	10.91	sheen	-	23.87	NA
<b>MW-27</b>	2/14/2000	3.67	NP	-	32.02	NA
(35.69)	5/22/2000	4.91	NP	-	30.78	NA
	8/23/2000	6.15	NP	-	29.54	NA
	11/28/2000	5.49	NP	-	30.20	NA
	2/21/2001	5.64	NP	-	30.05	NA
	5/15/2001	5.31	NP	-	30.38	NA
	9/19/2001	6.68	NP	-	29.01	NA
	12/19/2001	4.40	NP	-	31.29	NA
	3/13/2002	3.97	NP	-	31.72	NA
<b>MW-28</b>	2/14/2000	4.03	NP	-	30.36	NA
(34.39)	5/22/2000	5.44	NP	-	28.95	1.0
	8/23/2000	9.55	NP	-	24.84	NA
	11/28/2000	11.34	sheen	-	23.05	0.4
	2/21/2001	8.52	8.51	0.01	25.88	0.1
	5/15/2001	8.54	sheen	-	25.85	NA
	9/19/2001	13.75	13.48	0.27	20.86	0.6
	12/19/2001	4.47	NP	-	29.92	0.4
	3/13/2002	4.49	sheen	-	29.90	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-29</b> (35 77)	2/14/2000	12.98	NP	-	22.79	NA
	5/22/2000	13.49	NP	-	22.28	NA
	8/23/2000	14.53	NP	-	21.24	NA
	11/28/2000	14.84	NP	-	20.93	NA
	2/21/2001	14.54	NP	-	21.23	NA
	5/15/2001	14.52	NP	-	21.25	NA
	9/19/2001	15.57	NP	-	20.20	NA
	12/19/2001	13.59	NP	-	22.18	NA
	3/13/2002	13.21	NP	-	22.56	NA
<b>MW-30</b> (36 39)	2/14/2000	3.97	NP	-	32.42	NA
	5/22/2000	5.37	NP	-	31.02	NA
	8/23/2000	7.06	NP	-	29.33	NA
	11/28/2000	7.34	NP	-	29.05	NA
	2/21/2001	6.74	NP	-	29.65	NA
	5/15/2001	6.50	NP	-	29.89	NA
	9/19/2001	8.28	NP	-	28.11	NA
	12/19/2001	4.35	NP	-	32.04	NA
	3/13/2002	4.31	NP	-	32.08	NA
<b>MW-31</b> (35 66)	2/14/2000	5.19	NP	-	30.47	NA
	5/22/2000	6.66	NP	-	29.00	NA
	8/23/2000	8.41	NP	-	27.25	NA
	11/28/2000	8.86	NP	-	26.80	NA
	2/21/2001	8.07	NP	-	27.59	NA
	5/15/2001	7.90	NP	-	27.76	NA
	9/19/2001	9.69	NP	-	25.97	NA
	12/19/2001	5.43	NP	-	30.23	NA
	3/13/2002	5.31	NP	-	30.35	NA
<b>MW-32</b> (37 01)	2/14/2000	3.57	NP	-	33.44	NA
	5/22/2000	4.83	NP	-	32.18	NA
	8/23/2000	6.41	NP	-	30.60	NA
	11/28/2000	6.69	NP	-	30.32	NA
	2/21/2001	6.11	NP	-	30.90	NA
	5/15/2001	5.99	NP	-	31.02	NA
	9/19/2001	7.64	NP	-	29.37	NA
	12/19/2001	4.30	NP	-	32.71	NA
	3/13/2002	3.71	NP	-	33.30	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Elevation	SPH Recovered* (gallons)
<b>MW-33</b> (39.34)	2/14/2000	19.59	NP	-	19.75	NA
	5/22/2000	20.15	NP	-	19.19	NA
	8/23/2000	20.88	NP	-	18.46	NA
	11/28/2000	20.98	NP	-	18.36	NA
	2/21/2001	20.78	NP	-	18.56	NA
	5/15/2001	20.83	NP	-	18.51	NA
	9/19/2001	21.43	NP	-	17.91	NA
	12/19/2001	12.62	NP	-	26.72	NA
	3/13/2002	19.61	NP	-	19.73	NA
<b>MW-34</b> (39.67)	2/14/2000	19.31	NP	-	20.36	NA
	5/22/2000	19.75	NP	-	19.92	NA
	8/23/2000	20.88	NP	-	18.79	NA
	11/28/2000	20.39	NP	-	19.28	NA
	2/21/2001	20.19	NP	-	19.48	NA
	5/15/2001	20.18	NP	-	19.49	NA
	9/19/2001	20.60	NP	-	19.07	NA
	12/19/2001	19.20	NP	-	20.47	NA
	3/13/2002	19.37	NP	-	20.30	NA
<b>MW-35</b> (33.39)	2/14/2000	2.34	NP	-	31.05	NA
	5/22/2000	3.21	NP	-	30.18	NA
	8/23/2000	4.98	NP	-	28.41	NA
	11/28/2000	5.54	NP	-	27.85	NA
	2/21/2001	4.67	NP	-	28.72	NA
	5/15/2001	4.35	NP	-	29.04	NA
	9/18/2001	6.33	NP	-	27.06	NA
	12/19/2001	5.84	NP	-	27.55	NA
	3/13/2002	2.61	NP	-	30.78	NA
<b>MW-36</b> (34.88)	2/14/2000	14.04	NP	-	20.84	NA
	5/22/2000	14.62	NP	-	20.26	NA
	8/23/2000	15.39	NP	-	19.49	NA
	11/28/2000	15.72	NP	-	19.16	NA
	2/21/2001	15.49	NP	-	19.39	NA
	5/15/2001	15.51	NP	-	19.37	NA
	9/19/2001	16.08	NP	-	18.80	NA
	12/20/2001	14.98	NP	-	19.90	NA
	3/13/2002	14.18	NP	-	20.70	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-37</b>	2/14/2000	14.71	NP	-	20.15	NA
(34.86)	5/22/2000	15.27	NP	-	19.59	NA
	8/23/2000	16.06	NP	-	18.80	NA
	11/28/2000	16.32	NP	-	18.54	NA
	2/21/2001	16.10	NP	-	18.76	NA
	5/15/2001	16.11	NP	-	18.75	NA
	9/19/2001	16.69	NP	-	18.17	NA
	12/19/2001	15.10	NP	-	19.76	NA
	3/13/2002	14.64	14.62	0.02	20.24	0.1
<b>MW-38</b>	2/14/2000	4.72	NP	-	32.78	NA
(37.50)	5/22/2000	6.17	NP	-	31.33	NA
	8/23/2000	8.02	NP	-	29.48	NA
	11/28/2000	8.41	NP	-	29.09	NA
	2/21/2001	7.62	NP	-	29.88	NA
	5/15/2001	7.65	sheen	-	29.85	NA
	9/18/2001	9.52	NP	-	27.98	NA
	12/19/2001	6.05	NP	-	31.45	NA
	3/13/2002	4.97	NP	-	32.53	NA
<b>MW-39</b>	2/14/2000	NM	NP	-	NA	NA
(35.02)	5/22/2000	13.56	NP	-	21.46	NA
	8/23/2000	14.15	NP	-	20.87	NA
	11/28/2000	14.52	NP	-	20.50	NA
	2/21/2001	14.30	NP	-	20.72	NA
	5/15/2001	14.24	NP	-	20.78	NA
	9/19/2001	14.82	NP	-	20.20	NA
	12/19/2001	13.52	NP	-	21.50	NA
	3/13/2002	13.26	NP	-	21.76	NA
<b>MW-40</b>	2/14/2000	13.64	NP	-	20.01	NA
(33.65)	5/22/2000	14.28	NP	-	19.37	NA
	8/23/2000	15.01	NP	-	18.64	NA
	11/28/2000	15.15	NP	-	18.50	NA
	2/21/2001	14.97	NP	-	18.68	NA
	5/15/2001	15.00	NP	-	18.65	NA
	9/19/2001	15.58	NP	-	18.07	NA
	12/19/2001	13.72	NP	-	19.93	NA
	3/13/2002	13.58	NP	-	20.07	NA

**NOTES:**

If SPH Thickness equals 0.0 feet, then non-measurable sheen was observed

NP - No measurable product

NA - Not Applicable

NM - Not Measured

\* - SPH Recovered for latest quarter monitored

GWE = TOC - (DTW - (0.8 x DTP - DTW)) Where 0.8 = The density of the SPH

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
Tosco Corporation- Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-1</b>	2/14/2000	16.82	NP	-	17.86	NA
(34.68)	5/22/2000	17.05	NP	-	17.63	NA
	8/22/2000	17.48	NP	-	17.20	NA
	11/27/2000	17.82	NP	-	16.86	NA
	2/20/2001	17.71	NP	-	16.97	NA
	5/15/2001	17.68	NP	-	17.00	NA
	9/18/2001	18.01	NP	-	16.67	NA
	12/20/2001	17.10	NP	-	17.58	NA
	3/13/2002	16.77	NP	-	17.91	NA
<b>B-2</b>	2/14/2000	16.68	NP	-	18.67	NA
(35.35)	5/22/2000	17.06	NP	-	18.29	NA
	8/22/2000	17.61	NP	-	17.74	NA
	11/27/2000	17.97	NP	-	17.38	NA
	2/20/2001	17.82	NP	-	17.53	NA
	5/15/2001	17.74	NP	-	17.61	NA
	9/18/2001	18.23	NP	-	17.12	NA
	12/20/2001	17.06	NP	-	18.29	NA
	3/13/2002	16.80	NP	-	18.55	NA
<b>B-3</b>	2/14/2000	18.14	NP	-	16.67	NA
(34.81)	5/22/2000	18.36	NP	-	16.45	NA
	8/22/2000	19.05	NP	-	15.76	NA
	11/27/2000	19.31	NP	-	15.50	NA
	2/20/2001	19.22	NP	-	15.59	NA
	5/15/2001	19.26	NP	-	15.55	NA
	9/18/2001	19.63	NP	-	15.18	NA
	12/20/2001	18.03	NP	-	16.78	NA
	3/13/2002	18.12	NP	-	16.69	NA
<b>B-4</b>	2/14/2000	18.25	17.59	0.66	16.98	3
(34.70)	5/22/2000	17.80	NP	-	16.90	0.5
	8/22/2000	18.22	18.21	0.01	16.49	NA
	11/27/2000	18.55	NP	-	16.15	NA
	2/20/2001	18.49	18.48	0.01	16.22	NA
	5/15/2001	18.47	18.46	0.01	16.24	0.1
	9/18/2001	18.75	18.74	0.01	15.96	0.1
	12/20/2001	18.05	NP	-	16.65	NA
	3/13/2002	17.69	NP	-	17.01	0.1



**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
Tosco Corporation- Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-5</b> (34.83)	2/14/2000	16.24	NP	-	18.59	NA
	5/22/2000	16.63	NP	-	18.20	NA
	8/22/2000	16.98	sheen	-	17.85	NA
	11/27/2000	17.36	NP	-	17.47	NA
	2/20/2001	17.23	NP	-	17.60	NA
	5/15/2001	17.18	NP	-	17.65	NA
	9/18/2001	17.49	NP	-	17.34	NA
	12/20/2001	16.68	NP	-	18.15	NA
	3/13/2002	16.28	NP	-	18.55	NA
<b>B-6</b> (35.49)	2/14/2000	16.53	NP	-	18.96	NA
	5/22/2000	16.95	NP	-	18.54	NA
	8/22/2000	17.40	NP	-	18.09	NA
	11/27/2000	17.80	NP	-	17.69	NA
	2/20/2001	17.64	NP	-	17.85	NA
	5/15/2001	17.56	NP	-	17.93	NA
	9/18/2001	17.95	NP	-	17.54	NA
	12/20/2001	17.02	NP	-	18.47	NA
	3/13/2002	16.57	NP	-	18.92	NA
<b>B-16</b> (35.82)	2/14/2000	16.84	NP	-	18.98	NA
	5/22/2000	17.27	NP	-	18.55	NA
	8/22/2000	17.76	NP	-	18.06	NA
	11/27/2000	18.16	NP	-	17.66	NA
	2/20/2001	17.98	NP	-	17.84	NA
	5/15/2001	18.04	NP	-	17.78	NA
	9/18/2001	18.44	NP	-	17.38	NA
	12/20/2001	17.43	NP	-	18.39	NA
	3/13/2002	17.02	NP	-	18.80	NA
<b>B-17</b> (35.61)	2/14/2000	16.83	NP	-	18.78	NA
	5/22/2000	17.20	NP	-	18.41	NA
	8/22/2000	17.76	NP	-	17.85	NA
	11/27/2000	18.05	NP	-	17.56	NA
	2/20/2001	17.88	NP	-	17.73	NA
	5/15/2001	17.84	NP	-	17.77	NA
	9/18/2001	18.21	NP	-	17.40	NA
	12/20/2001	17.31	NP	-	18.30	NA
	3/13/2002	16.91	NP	-	18.70	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
Tosco Corporation- Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-18</b> (35.49)	2/14/2000	18.55	NP	-	16.94	NA
	5/22/2000	18.66	NP	-	16.83	NA
	8/22/2000	19.11	NP	-	16.38	NA
	11/27/2000	19.43	NP	-	16.06	NA
	2/20/2001	19.44	NP	-	16.05	NA
	5/15/2001	19.43	NP	-	16.06	NA
	9/18/2001	19.68	NP	-	15.81	NA
	12/20/2001	---Unable to Locate---				
	3/13/2002	---Inaccessible - Covered with Sand---				
<b>B-22</b> (35.83)	2/14/2000	17.91	NP	-	17.92	1
	5/22/2000	18.00	NP	-	17.83	NA
	8/22/2000	18.66	18.65	0.01	17.18	NA
	11/27/2000	19.02	sheen	-	16.81	0.1
	2/20/2001	19.02	18.99	0.03	16.83	NA
	5/15/2001	19.01	19.00	0.01	16.83	0.1
	9/18/2001	----- Well Has Been Buried -----				
	12/20/2001	----Well Damaged During Construction Activities----				
	3/13/2002	----Well Damaged During Construction Activities----				
<b>B-25</b> (35.78)	2/14/2000	18.39	NP	-	17.39	NA
	5/22/2000	17.67	NP	-	18.11	NA
	8/22/2000	19.09	NP	-	16.69	NA
	11/27/2000	19.51	NP	-	16.27	NA
	2/20/2001	18.79	NP	-	16.99	NA
	5/15/2001	19.54	NP	-	16.24	NA
	9/18/2001	19.86	NP	-	15.92	NA
	12/20/2001	----Could Not Access----				
	3/13/2002	18.52	NP	-	17.26	NA
<b>B-27</b> (35.74)	2/14/2000	17.61	NP	-	18.13	NA
	5/22/2000	17.76	NP	-	17.98	NA
	8/22/2000	18.27	NP	-	17.47	NA
	11/27/2000	18.71	NP	-	17.03	0.1
	2/20/2001	18.66	18.65	0.01	17.09	0.2
	5/15/2001	18.74	18.66	0.08	17.06	0.2
	9/18/2001	18.99	NP	-	16.75	0.3
	12/20/2001	18.66	NP	-	17.08	0.2
	3/13/2002	17.76	NP	-	17.98	0.2

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
Tosco Corporation- Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-35</b>	2/14/2000	15.71	NP	-	17.85	NA
(33.56)	5/22/2000	16.00	NP	-	17.56	NA
	8/22/2000	16.36	NP	-	17.20	NA
	11/27/2000	16.71	NP	-	16.85	NA
	2/20/2001	16.65	NP	-	16.91	NA
	5/15/2001	15.56	NP	-	18.00	NA
	9/18/2001	16.90	NP	-	16.66	NA
	12/20/2001	15.95	NP	-	17.61	NA
	3/13/2002	15.70	NP	-	17.86	NA
<b>B-36</b>	2/14/2000	14.33	NP	-	16.69	NA
(31.02)	5/22/2000	14.64	NP	-	16.38	NA
	8/22/2000	15.28	NP	-	15.74	NA
	11/27/2000	15.55	NP	-	15.47	NA
	2/20/2001	15.48	NP	-	15.54	NA
	5/15/2001	15.47	NP	-	15.55	NA
	9/18/2001	15.83	NP	-	15.19	NA
	12/20/2001	14.17	NP	-	16.85	NA
	3/13/2002	14.31	NP	-	16.71	NA
<b>B-37</b>	2/14/2000	18.96	NP	-	16.87	NA
(35.83)	5/22/2000	19.05	NP	-	16.78	NA
	8/22/2000	19.77	NP	-	16.06	NA
	11/27/2000	20.18	NP	-	15.65	NA
	2/20/2001	22.05	NP	-	13.78	NA
	5/15/2001	20.16	NP	-	15.67	NA
	9/18/2001	----- Well Has Been Buried -----				
	12/20/2001	----Could Not Locate----				
	3/13/2002	19.09	NP	-	16.74	NA
<b>B-40</b>	2/14/2000	17.34	NP	-	17.36	1
(34.70)	5/22/2000	18.28	17.48	0.80	17.06	5.5
	8/22/2000	19.65	18.21	1.44	16.20	0.6
	11/27/2000	20.03	18.55	1.48	15.85	1.25
	2/20/2001	19.85	18.54	1.31	15.90	1.3
	5/15/2001	19.88	18.58	1.30	15.86	0.85
	9/18/2001	20.90	19.07	1.83	15.26	1
	12/20/2001	18.35	17.36	0.99	17.14	0.65
	3/13/2002	17.51	17.32	0.19	17.34	0.85

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
Tosco Corporation- Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-41</b>	2/14/2000	17.73	NP	-	16.90	NA
(34 63)	5/22/2000	18.89	NP	-	15.74	NA
	8/22/2000	18.44	NP	-	16.19	NA
	11/27/2000	18.81	NP	-	15.82	NA
	2/20/2001	18.78	sheen	-	15.85	NA
	5/15/2001	18.78	NP	-	15.85	NA
	9/18/2001	----- Well Has Been Buried -----				
	12/20/2001	16.86	NP	-	17.77	NA
	3/13/2002	20.07	20.03	0.04	14.59	NA
<b>DW-1</b>	2/14/2000	18.87	NP	-	17.06	NA
(35 93)	5/22/2000	18.94	NP	-	16.99	NA
	8/22/2000	19.51	NP	-	16.42	NA
	11/27/2000	19.88	NP	-	16.05	NA
	2/20/2001	19.83	NP	-	16.10	NA
	5/15/2001	19.87	NP	-	16.06	NA
	9/18/2001	20.19	NP	-	15.74	NA
	12/20/2001	19.56	NP	-	16.37	NA
	3/13/2002	18.96	NP	-	16.97	NA
<b>DW-2</b>	2/14/2000	18.91	NP	-	17.14	NA
(36 05)	5/22/2000	19.03	NP	-	17.02	NA
	8/22/2000	19.62	NP	-	16.43	NA
	11/27/2000	10.01	NP	-	26.04	NA
	2/20/2001	20.02	NP	-	16.03	NA
	5/15/2001	20.00	NP	-	16.05	NA
	9/18/2001	20.35	NP	-	15.70	NA
	12/20/2001	19.62	NP	-	16.43	NA
	3/13/2002	19.06	NP	-	16.99	NA
<b>EX-39</b>	2/14/2000	17.42	17.09	0.33	15.93	10
(33 09)	5/22/2000	17.35	17.29	0.06	15.79	5
	8/22/2000	17.98	17.95	0.03	15.13	0.1
	11/27/2000	18.38	sheen	-	14.71	0.1
	2/20/2001	18.49	18.36	0.13	14.70	2.55
	5/15/2001	19.29	18.19	1.10	14.68	5.0
	9/18/2001	----- Well Has Been Buried -----				
	12/20/2001	----Well Damaged During Construction Activities----				
	3/13/2002	----Well Damaged During Construction Activities----				

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
Tosco Corporation- Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>IT-E</b> (36.07)	2/14/2000	19.01	NP	-	17.06	NA
	5/22/2000	19.03	NP	-	17.04	NA
	8/22/2000	19.93	NP	-	16.14	NA
	11/27/2000	20.12	NP	-	15.95	NA
	2/20/2001	20.11	NP	-	15.96	NA
	5/15/2001	20.29	NP	-	15.78	NA
	9/18/2001	20.65	NP	-	15.42	NA
	12/20/2001	----Could Not Access Well----				
	3/13/2002	19.31	NP	-	16.76	NA
	2/14/2000	17.46	NP	-	18.53	NA
<b>IT-W</b> (35.99)	5/22/2000	17.75	NP	-	18.24	NA
	8/22/2000	18.17	NP	-	17.82	NA
	11/27/2000	18.51	NP	-	17.48	NA
	2/20/2001	18.43	NP	-	17.56	NA
	5/15/2001	18.33	NP	-	17.66	NA
	9/18/2001	18.68	NP	-	17.31	NA
	12/20/2001	17.76	NP	-	18.23	NA
	3/13/2002	17.50	NP	-	18.49	NA
	2/14/2000	6.26	NP	-	11.98	NA
<b>P-1</b> (18.24)	5/22/2000	6.89	NP	-	11.35	NA
	8/22/2000	10.51	NP	-	7.73	NA
	11/27/2000	8.62	NP	-	9.62	NA
	2/20/2001	9.14	NP	-	9.10	NA
	5/15/2001	9.17	NP	-	9.07	NA
	9/18/2001	9.97	NP	-	8.27	NA
	12/20/2001	6.01	NP	-	12.23	NA
	3/13/2002	7.07	NP	-	11.17	NA
<b>P-2</b> (17.85)	2/14/2000	4.18	NP	-	13.67	NA
	5/22/2000	4.66	NP	-	13.19	NA
	8/22/2000	5.27	NP	-	12.58	NA
	11/27/2000	5.28	NP	-	12.57	NA
	2/20/2001	5.32	NP	-	12.53	NA
	5/15/2001	5.18	NP	-	12.67	NA
	9/18/2001	5.50	NP	-	12.35	NA
	12/20/2001	4.21	NP	-	13.64	NA
	3/13/2002	4.40	NP	-	13.45	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
Tosco Corporation- Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>RES-N</b>	2/14/2000	20.90	NP	-	17.68	NA
(38.58)	5/22/2000	21.01	NP	-	17.57	NA
	8/22/2000	21.58	NP	-	17.00	NA
	11/27/2000	21.95	NP	-	16.63	NA
	2/20/2001	21.98	NP	-	16.60	NA
	5/15/2001	21.94	NP	-	16.64	NA
	9/18/2001	22.27	NP	-	16.31	NA
	12/20/2001	21.55	NP	-	17.03	NA
	3/13/2002	21.02	NP	-	17.56	NA
<b>RES-O</b>	2/14/2000	16.89	NP	-	19.14	NA
(36.03)	5/22/2000	17.29	NP	-	18.74	NA
	8/22/2000	17.86	NP	-	18.17	NA
	11/27/2000	18.38	NP	-	17.65	NA
	2/20/2001	NM	NP	-	-	NA
	5/15/2001	18.04	NP	-	17.99	NA
	9/18/2001	18.43	NP	-	17.60	NA
	12/20/2001	17.63	NP	-	18.40	NA
	3/13/2002	16.87	NP	-	19.16	NA
<b>U-2</b>	2/14/2000	15.31	NP	-	19.71	NA
(35.02)	5/22/2000	15.41	NP	-	19.61	NA
	8/22/2000	16.13	NP	-	18.89	NA
	11/27/2000	16.81	NP	-	18.21	NA
	2/20/2001	16.81	NP	-	18.21	NA
	5/15/2001	16.82	NP	-	18.20	NA
	9/18/2001	17.20	NP	-	17.82	NA
	12/20/2001	16.99	NP	-	18.03	NA
	3/13/2002	15.59	NP	-	19.43	NA
<b>U-3</b>	2/14/2000	12.95	NP	-	22.30	NA
(35.25)	5/22/2000	13.55	NP	-	21.70	NA
	8/22/2000	14.19	NP	-	21.06	NA
	11/27/2000	15.68	NP	-	19.57	NA
	2/20/2001	14.38	NP	-	20.87	NA
	5/15/2001	14.26	NP	-	20.99	NA
	9/18/2001	14.89	NP	-	20.36	NA
	12/20/2001	13.22	NP	-	22.03	NA
	3/13/2002	13.01	NP	-	22.24	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
Tosco Corporation- Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>U-4</b>	2/14/2000	15.86	15.77	0.09	18.67	2.5
(34.46)	5/22/2000	16.03	NP	-	18.43	NA
	8/22/2000	16.38	NP	-	18.08	NA
	11/27/2000	16.83	NP	-	17.63	NA
	2/20/2001	16.85	sheen	-	17.61	NA
	5/15/2001	16.61	16.57	0.04	17.88	0.1
	9/18/2001	19.96	sheen	-	14.50	0.1
	12/20/2001	16.37	16.30	0.07	18.15	0.11
	3/13/2002	15.60	NP	-	18.86	0.38
<b>U-5</b>	2/14/2000	17.85	NP	-	16.28	NA
(34.13)	5/22/2000	18.03	NP	-	16.10	NA
	8/22/2000	19.02	NP	-	15.11	NA
	11/27/2000	19.03	NP	-	15.10	NA
	2/20/2001	19.44	NP	-	14.69	NA
	5/15/2001	19.57	19.22	0.35	14.56	0.65
	9/18/2001	20.04	20.02	0.02	14.09	0.6
	12/20/2001	----Unable to Locate----				0.01
	3/13/2002	----Inaccessible - Covered by Sand----				
<b>U-5A</b>	2/14/2000	6.46	NP	-	27.31	NA
(33.77)	5/22/2000	7.00	6.99	0.01	26.78	1
	8/22/2000	8.58	8.57	0.01	25.20	0.1
	11/27/2000	9.71	NP	-	24.06	0.1
	2/20/2001	9.04	NP	-	24.73	0.1
	5/15/2001	8.99	sheen	-	24.78	NA
	9/18/2001	10.29	sheen	-	23.48	0.1
	12/20/2001	7.81	NP	-	25.96	NA
	3/13/2002	6.51	NP	-	27.26	NA
<b>NOTES:</b> NP = No measurable product NA = Not Applicable NM = Not Measured * = SPH Recovered for latest quarter monitored - = No Measurable Product Thickness GWE = TOC - (DTW - (0.8 x DTP - DTW)) Where 0.8 = The density of the SPH						

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Ethyl-benzene (µg/l)	Toluene (µg/l)	Xylenes (µg/l)
<b>CHEVRON</b>					
<b>B-7</b>	02/18/00	0.795	4.00	1.31	6.20
	05/23/00	<0.500U	1.41	0.678	1.22
	dup***** 05/23/00	<0.500U	1.06	0.691	<1.00U
	08/25/00	NS/F	NS/F	NS/F	NS/F
	11/30/00	NS/S	NS/S	NS/S	NS/S
	02/22/01	0.690	<0.500U	0.736	<1.00U
	05/17/01	<0.500U	<0.500U	0.700	<1.00U
	03/20/03	<0.500U	<0.500U	0.740	<1.00U
<b>B-9</b>	05/23/00	<0.500U	0.737	0.535	<1.00U
	08/25/00	<0.500U	<0.500U	<0.500U	<1.00U
	11/30/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/22/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/17/01	<0.500U	<0.500U	<0.500U	<1.00U
	09/19/01	<0.500U	<0.500U	0.913	<1.00U
	03/21/02	<0.500U	<0.500U	<0.500U	<1.00U
	09/24/02	<0.500U	<0.500U	<0.500U	<1.00U
<b>B-10</b>	03/20/03	<0.500U	<0.500U	<0.500U	<1.00U
	02/18/00	3.85	8.78	4.42	14.7
	dup*** 02/18/00	3.72	7.80	4.10	13.8
	05/23/00	1.20	4.14	2.93	6.53
	08/25/00	1.40	1.45	2.80	4.80
	11/30/00	1.20	<0.500U	2.69	4.60
	02/23/01	3.74	0.983	3.94	6.78
	05/17/01	4.87	1.25	4.36	8.56
	09/19/01	0.711	<0.500U	1.80	2.50
	03/21/02	3.15	1.19	2.60	2.43
	09/24/02	1.41	0.753	1.43	2.46
	03/20/03	0.680	<0.500U	1.76	2.34
<b>B-11</b>	02/18/00	29.2	4.36	6.14	14.1
	05/23/00	7.45	1.42	4.95	8.52
	08/25/00	11.2	2.39	6.53	11.2
	11/30/00	8.72	<5.00U	5.36	<10.0U
	02/22/01	24.2	2.13	5.11	8.98
	05/17/01	17.9	2.77	6.46	11.4
<b>B-14</b>	02/18/00	119	80.0	18.1	38.0
	05/23/00	125	69.2	15.9	30.7
	08/25/00	382	194	44.6	70.3
	11/30/00	292	148	37.3	52.4
	02/22/01	402	229	42.6	78.2
<b>B-19</b>	05/17/01	332	190	37.4	56.2
	03/20/03	7.76	0.620	2.09	2.51



**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Ethyl-benzene (µg/l)	Toluene (µg/l)	Xylenes (µg/l)
<b>B-20</b>	03/20/03	<0.500U	<0.500U	<0.500U	<1.00U
<b>B-21</b>	09/19/01	<0.500U	<0.500U	1.47	<2.00U
	03/21/02	<0.500U	<0.500U	0.679	<1.00U
	09/24/02	<0.500U	0.517	1.20	1.20
	03/20/03	<0.500U	<0.500U	<0.500U	<1.00U
<b>B-28</b>	02/18/00	0.754	0.545	<0.500U	<1.00U
	05/23/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/25/00	<0.500U	<0.500U	<0.500U	<1.00U
	11/30/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/23/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/17/01	<0.500U	<0.500U	<0.500U	<1.00U
	09/20/01	2.12	2.93	<0.500U	<2.00U
	03/21/02	<0.500U	<0.500U	<0.500U	<1.00U
	09/24/02	<0.500U	<0.500U	<0.500U	<1.00U
	03/20/03	<0.500U	<0.500U	<0.500U	<1.00U
<b>B-29</b>	09/20/01	1.30	<0.500U	0.710	<1.00U
	03/21/02	<0.500U	<0.500U	<0.500U	<1.00U
	09/24/02	<0.500U	<0.500U	<0.500U	<1.00U
	03/20/03	<0.500U	<0.500U	<0.500U	<1.00U
<b>B-30</b>	02/18/00	38.9	2.44	5.29	10.3
	05/23/00	18.8	0.682	2.53	4.57
	08/25/00	81.2	2.35	12.5	21.9
	11/30/00	59.6	1.92	10.0	18.8
	02/23/01	61.6	5.31	9.52	19.4
	dup** 02/23/01	61.8	3.24	9.23	16.0
	05/17/01	95.1	4.12	18.0	14.6
	09/20/01	38.7	<2.50U	5.66	<10.0U
	dup 09/20/01	38.6	<5.00U	6.18	<10.0U
	03/21/02	113	6.09	17.0	24.2
	dup***** 03/21/02	114	6.20	17.2	25.0
	09/24/02	30.1	1.56	6.60	12.0
	dup***** 09/24/02	28.0	1.44	6.42	11.3
	03/20/03	17.3	0.500	4.49	5.96
	dup* 03/20/03	17.4	0.510	4.43	6.68
<b>B-32</b>	03/20/03	<0.500U	<0.500U	<0.500U	<1.00U
<b>B-33</b>	03/20/03	<0.500U	<0.500U	<0.500U	<1.00U
	09/24/02	28.0	1.44	6.42	11.3
<b>CR-1</b>	09/20/01	<0.500U	<0.500U	<0.500U	<1.00U
	03/21/02	<0.500U	<0.500U	<0.500U	<1.00U
	09/24/02	<0.500U	<0.500U	<0.500U	<1.00U
	03/20/03	<0.500U	<0.500U	<0.500U	<1.00U

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Ethyl-benzene (µg/l)	Toluene (µg/l)	Xylenes (µg/l)
<b>CR-8</b>	02/18/00	<0.500U	3.82	0.673	6.55
	05/23/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/25/00	<0.500U	<0.500U	<0.500U	<1.00U
	11/30/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/22/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/16/01	<0.500U	0.841	0.519	1.77
<b>CR-9</b>	02/18/00	<0.500U	<0.500U	<0.500U	<1.00U
	05/23/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/25/00	<0.500U	<0.500U	<0.500U	<1.00U
	dup 08/25/00	<0.500U	<0.500U	<0.500U	<1.00U
	11/30/00	<0.500U	<0.500U	<0.500U	<1.00U
	dup 11/30/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/22/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/16/01	<0.500U	<0.500U	<0.500U	<1.00U
<b>CR-11</b>	dup 05/16/01	<0.500U	<0.500U	<0.500U	<1.00U
	02/18/00	81.0	4.41	4.95	6.17
	05/23/00	40.2	2.54	1.95	<1.00U
	08/25/00	107	22.1	5.30	8.41
	11/30/00	NS/S	NS/S	NS/S	NS/S
	02/22/01	84.2	3.24	2.47	6.25
	05/16/01	119	5.85	4.43	14.3
<b>TB-LB</b>	02/18/00	<0.500U	<0.500U	<0.500U	<1.00U
	05/23/00	<0.500U	<0.500U	<0.500U	<1.00U
	11/30/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/22/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/16/01	<0.500U	<0.500U	<0.500U	<1.00U
	09/19/01	<0.500U	<0.500U	<0.500U	<1.00U
	03/21/02	1.16	<0.500U	3.90	1.95
	09/24/02	<0.500U	<0.500U	<0.500U	<1.00U
	03/20/03	<0.500U	<0.500U	<0.500U	<1.00U

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Ethyl-benzene (µg/l)	Toluene (µg/l)	Xylenes (µg/l)
<b>Kinder Morgan</b>					
<b>MW-8</b>	02/16/00	9.79	7.97	2.51	12.1
	05/31/00	16.6	3.05	3.85	10.2
	08/24/00	26.0	28.2	5.78	24.0
	12/01/00	17.8	3.19	4.59	11.1
	02/22/01	11.4	<0.500U	2.79	8.88
	05/16/01	15.1	1.18	2.79	6.40
	dup 05/16/01	13.2	0.978	2.23	5.47
	09/21/01	13.0	1.08	9.54	7.66
	03/14/02	1.95	0.618	1.09	2.22
	dup 03/14/02	1.96	<0.500U	0.955	1.93
	09/27/02	4.85	0.819	2.30	4.25
	03/18/03	3.12	<0.500U	<0.500U	2.24
	dup 03/18/03	2.36	<0.500U	<0.500U	2.62
<b>MW-10</b>	02/16/00	6.60	0.996	2.33	3.33
	05/31/00	6.78	<0.500U	0.794	1.02
	08/24/00	<0.500U	<0.500U	<0.500U	<1.00U
	12/01/00	5.40	<0.500U	1.32	1.78
	02/22/01	1.15	<0.500U	1.15	1.98
	05/16/01	11.6	0.894	1.42	2.92
<b>MW-11</b>	02/16/00	5260	2580	2360	11200
	05/31/00	4120	2720	1460	9290
	08/24/00	2490	2020	787	5960
	12/01/00	2330	1610	755	5420
	02/22/01	3520	2230	1230	8130
	05/16/01	3800	2510	1290	8980
<b>MW-13</b>	02/16/00	<0.500U	<0.500U	<0.500U	<1.00U
	05/31/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/24/00	<0.500U	<0.500U	<0.500U	<1.00U
	12/01/00	<0.500U	<0.500U	<0.500U	<1.00U
	dup 12/01/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/22/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/16/01	<0.500U	<0.500U	<0.500U	<1.00U
<b>MW-15</b>	02/17/00	2.89	0.442	0.493	1.15
	05/30/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/24/00	<0.500U	<0.500U	<0.500U	<1.00U
	12/01/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/22/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/16/01	<0.500U	<0.500U	<0.500U	<1.00U
<b>MW-21</b>	02/17/00	<0.300U	0.997	1.21	3.36
	05/30/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/23/00	<0.500U	<0.500U	<0.500U	<1.00U
	12/01/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/22/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/16/01	<0.500U	<0.500U	<0.500U	<1.00U

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Ethyl-benzene (µg/l)	Toluene (µg/l)	Xylenes (µg/l)
<b>MW-22</b>	02/17/00	2060	4720	2060	13200
	05/30/00	2140	4240	1560	9150
	08/23/00	1670	3670	1500	7720
	12/01/00	1450	3960	1330	8280
	02/21/01	NS/S	NS/S	NS/S	NS/S
	05/16/01	NS/F	NS/F	NS/F	NS/F
<b>MW-23</b>	02/17/00	NS/F	NS/F	NS/F	NS/F
	05/30/00	NS/F	NS/F	NS/F	NS/F
	08/23/00	NS/F	NS/F	NS/F	NS/F
	12/01/00	NS/F	NS/F	NS/F	NS/F
	02/22/01	76.8	102	12.6	90.4
	05/16/01	NS/S	NS/S	NS/S	NS/S
<b>MW-25</b>	09/21/01	<0.500U	<0.500U	<0.500U	<1.00U
	03/14/02	<0.500U	<0.500U	<0.500U	<1.00U
	09/27/02	<0.500U	<0.500U	<0.500U	<1.00U
	03/18/03	<0.500U	<0.500U	<0.500U	<1.00U
<b>MW-26</b>	02/17/00	1.04	11.9	3.11	17.1
	dup**** 02/17/00	1.31	18.6	4.01	26.2
	05/30/00	<0.500U	7.40	7.11	9.62
	08/23/00	<0.500U	10.8	3.67	3.54
	dup 08/23/00	<0.500U	15.9	4.81	6.20
	12/01/00	3.43	7.28	29.8	15.6
	02/21/01	NS/S	NS/S	NS/S	NS/S
	05/17/01	15.1	8.76	10.1	10.6
	09/27/02	7.66	5.90	7.24	6.44
	03/18/03	9.11	1.57	<0.500U	4.80
<b>MW-28</b>	02/16/00	1.29	8.26	3.13	14.7
	05/30/00	NS/S	NS/S	NS/S	NS/S
	08/23/00	NS/S	NS/S	NS/S	NS/S
	12/01/00	NS/S	NS/S	NS/S	NS/S
	02/21/01	NS/F	NS/F	NS/F	NS/F
	05/16/01	NS/S	NS/S	NS/S	NS/S
<b>MW-31</b>	02/16/00	0.579	<0.500U	0.629	1.51
	05/30/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/23/00	<0.500U	<0.500U	<0.500U	<1.00U
	12/01/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/22/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/17/01	<0.500U	<0.500U	<0.500U	<1.00U
<b>MW-32</b>	02/16/00	<0.500U	<0.500U	0.608	1.31
	05/30/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/23/00	<0.500U	<0.500U	<0.500U	<1.00U
	12/01/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/22/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/16/01	<0.500U	<0.500U	<0.500U	<1.00U

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Ethylbenzene (µg/l)	Toluene (µg/l)	Xylenes (µg/l)
<b>MW-33</b>	02/16/00	<0.500U	0.589	0.718	1.21
	05/30/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/24/00	<0.500U	<0.500U	<0.500U	<1.00U
	11/30/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/22/01	<0.500U	<0.500U	<0.500U	<1.00U
	dup 02/22/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/16/01	<0.500U	<0.500U	<0.500U	<1.00U
	09/21/01	<0.500U	<0.500U	<0.500U	<1.00U
	03/14/02	<0.500U	<0.500U	<0.500U	<1.00U
	09/27/02	<0.500U	<0.500U	<0.500U	<1.00U
	03/18/03	<0.500U	<0.500U	<0.500U	<1.00U
<b>MW-34</b>	09/21/01	<0.500U	<0.500U	<0.500U	<1.00U
	03/14/02	<0.500U	<0.500U	<0.500U	<1.00U
	09/27/02	<0.500U	<0.500U	<0.500U	<1.00U
	03/18/03	<0.500U	<0.500U	<0.500U	<1.00U
<b>MW-36</b>	02/16/00	<0.500U	1.32	2.36	6.29
	05/31/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/24/00	<0.500U	<0.500U	<0.500U	<1.00U
	11/30/00	<0.500U	0.548	<0.500U	<1.00U
	02/21/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/16/01	0.882	<0.500U	<0.500U	<1.00U
	09/21/01	<0.500U	<0.500U	<0.500U	<1.00U
	03/13/02	<0.500U	<0.500U	<0.500U	<1.00U
	03/18/03	<0.500U	<0.500U	<0.500U	<1.00U
<b>MW-37</b>	02/16/00	1.06	<0.500U	<0.500U	1.78
	05/30/00	33.0	<0.500U	0.957	2.10
	dup 05/30/00	31.4	0.768	0.755	1.72
	08/24/00	40.9	<0.500U	0.731	1.44
	11/30/00	10.7	<0.500U	0.594	<1.00U
	02/21/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/16/01	0.691	<0.500U	0.740	1.25
	09/21/01	<0.500U	<0.500U	1.04	1.31
	09/27/02	<0.500U	<0.500U	<0.500U	<1.00U
	dup 09/27/02	<0.500U	<0.500U	<0.500U	<1.00U
	03/18/03	<0.500U	<0.500U	<0.500U	<1.00U
<b>MW-40</b>	02/16/00	<0.500U	<0.500U	<0.500U	<1.00U
	05/30/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/24/00	<0.500U	<0.500U	<0.500U	<1.00U
	11/30/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/21/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/16/01	<0.500U	<0.500U	0.505	<1.00U
	09/21/01	<0.500U	<0.500U	<0.500U	<1.00U
	03/13/02	<0.500U	<0.500U	<0.500U	<1.00U
	09/27/02	<0.500U	<0.500U	<0.500U	<1.00U
	03/18/03	<0.500U	<0.500U	<0.500U	<1.00U
<b>TB-LB</b>	02/16/00	<0.500U	<0.500U	<0.500U	<1.00U
	05/30/00	<0.500U	<0.500U	<0.500U	<1.00U

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Ethyl-benzene (µg/l)	Toluene (µg/l)	Xylenes (µg/l)
<b>CONOCOPHILLIPS</b>					
<b>B-4</b>	05/26/00	82.3	4.00	12.7	14.8
dup*****	05/26/00	74.8	2.77	10.7	10.3
	08/23/00	NS/F	NS/F	NS/F	NS/F
	11/29/00	7.04	2.10	5.81	8.09
	02/20/01	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F
	09/26/02	16.5	5.14	8.36	27.6
<b>B-17</b>	02/17/00	274	15.4	24.0	37.7
	05/26/00	434	49.9	44.4	158
	08/28/00	372	10.8	21.1	15.4
	11/29/00	293	9.89	18.2	13.6
	02/23/01	258	11.8	21.3	21.6
dup	02/23/01	238	10.2	19.6	17.3
	05/17/01	165	6.82	17.0	15.7
dup	05/17/01	173	7.14	17.2	15.6
<b>B-18</b>	02/17/00	<0.500U	3.46	1.04	6.13
	05/26/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/28/00	<0.500U	<0.500U	<0.500U	<1.00U
	11/29/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/23/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/17/01	<0.500U	0.502	<0.500U	<1.00U
<b>B-22</b>	02/17/00	NS/S	NS/S	NS/S	NS/S
	05/26/00	0.508	0.543	0.522	2.17
	08/28/00	NS/F	NS/F	NS/F	NS/F
	11/29/00	NS/S	NS/S	NS/S	NS/S
	02/20/01	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F
<b>B-35</b>	02/17/00	31.6	11.0	13.5	27.4
	05/26/00	194	12.5	16.3	39.8
	08/28/00	287	8.42	15.3	<5.00U
	11/29/00	384	12.0	17.0	30.2
	02/23/01	45.6	4.87	12.4	20.5
	05/17/01	15.2	4.32	5.62	7.99
	09/20/01	58.0	3.31	9.78	15.9
	03/14/02	34.1	2.41	15.8	11.4
	09/26/02	95.8	14.0	11.3	26.3
	03/18/03	8.11	1.42	6.39	3.20

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**

Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Ethyl-benzene (µg/l)	Toluene (µg/l)	Xylenes (µg/l)
<b>B-36</b>	02/17/00	0.925	0.762	1.16	3.16
	05/26/00	<0.500U	0.502	0.820	<1.00U
	08/28/00	2.08	0.693	2.54	2.53
	11/29/00	1.14	1.02	2.53	2.78
	02/23/01	<0.500U	0.512	1.15	1.44
	05/17/01	<0.500U	0.545	0.819	1.80
	09/20/01	<0.500U	0.609	0.761	1.50
	dup 09/20/01	<0.500U	0.547	0.820	1.51
	03/14/02	<0.500U	<0.500U	<0.500U	<1.00U
	09/26/02	1.18	0.635	1.33	2.48
	03/18/03	<0.500U	<0.500U	<0.500U	<1.00U
<b>B-37</b>	02/17/00	<0.500U	0.795	1.06	1.97
	dup***** 02/17/00	<0.500U	0.630	0.517	1.18
	05/26/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/28/00	<0.500U	<0.500U	<0.500U	<1.00U
	11/29/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/23/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/17/01	<0.500U	<0.500U	<0.500U	<1.00U
	03/14/02	<0.500U	<0.500U	<0.500U	<1.00U
	09/26/02	<0.500U	<0.500U	<0.500U	<1.00U
	03/18/03	<0.500U	<0.500U	<0.500U	<1.00U
	dup 03/18/03	<0.500U	<0.500U	<0.500U	<1.00U
<b>B-40</b>	02/17/00	NS/S	NS/S	NS/S	NS/S
	05/26/00	NS/F	NS/F	NS/F	NS/F
	08/28/00	NS/F	NS/F	NS/F	NS/F
	11/29/00	NS/F	NS/F	NS/F	NS/F
	02/20/01	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F
<b>U-2</b>	02/17/00	3.13	3.59	1.93	3.43
	05/26/00	0.885	<0.500U	1.45	<1.00U
	08/28/00	<0.500U	0.604	<0.500U	<1.00U
	11/29/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/23/01	<0.500U	<0.500U	<0.500U	<1.00U
	05/17/01	<0.500U	<0.500U	<0.500U	<1.00U
	09/20/01	<0.500U	<0.500U	<0.500U	<1.00U
	03/14/02	0.986	0.905	1.60	<1.00U
	09/26/02	<0.500U	<0.500U	<0.500U	<1.00U
	03/18/03	<0.500U	<0.500U	<0.500U	<1.00U
<b>U-3</b>	02/17/00	<0.500U	0.952	0.993	3.17
	05/26/00	1.50	1.01	0.954	2.39
	08/28/00	<0.500U	0.793	<0.500U	<1.00U
	11/29/00	<0.500U	0.744	<0.500U	<1.00U
	dup 11/29/00	0.500	0.727	0.567	<1.00U
	02/23/01	14.8	1.84	2.58	<1.00U
	05/17/01	7.83	<0.500U	0.620	1.16

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Ethyl-benzene (µg/l)	Toluene (µg/l)	Xylenes (µg/l)
U-4	05/26/00	62.3	<0.500U	<0.500U	<1.00U
	08/28/00	15.0	1.76	<0.500U	<1.00U
	dup 08/28/00	14.3	2.99	0.509	1.04
	11/29/00	<2.50U	<2.50U	<2.50U	<5.00U
	02/23/01	0.844	6.84	1.07	11.2
	05/17/01	NS/F	NS/F	NS/F	NS/F
	09/26/02	0.760	1.07	0.552	2.99
	dup 09/26/02	0.771	2.21	0.623	4.14
U-5	02/17/00	3.86	0.501	0.654	2.54
	05/26/00	3.49	<0.500U	<0.500U	<1.00U
	08/28/00	<0.500U	<0.500U	<0.500U	<1.00U
	11/29/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/23/01	1.56	1.16	<0.500U	<1.00U
	05/17/01	NS/F	NS/F	NS/F	NS/F
	03/18/03	2.49	5.77	2.21	33.7
U-10	03/18/03	<0.500U	<0.500U	<0.500U	<1.00U
U-11	03/18/03	<0.500U	<0.500U	<0.500U	<1.00U
U-12	03/18/03	5.30	0.642	2.12	3.72
P-1	03/17/03	<0.500U	<0.500U	<0.500U	<1.00U
P-2	03/17/03	<0.500U	<0.500U	0.534	<1.00U
TB-LB	05/26/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/24/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/25/00	<0.500U	<0.500U	<0.500U	<1.00U
	08/28/00	<0.500U	<0.500U	<0.500U	<1.00U
	11/29/00	<0.500U	<0.500U	<0.500U	<1.00U
	12/01/00	<0.500U	<0.500U	<0.500U	<1.00U
	02/23/01	<0.500U	<0.500U	<0.500U	<1.00U

**Notes:**

2/00 and 5/00 data from IT Corporation  
8/00, 11/00, 2/01 and 5/01 data from KHM Environmental Management, Inc.  
NS/F = Not sampled floating product present  
NS/S = Not sampled sheen present  
µg/l = Micrograms per Liter  
< = Less than the laboratory method reporting limit (MRL)  
U = Analyte included in the analysis but not detected  
BTEX analysis by USEPA Method 8021B  
dup\* = duplicate for B-30 submitted as blind duplicate labeled as B-50  
dup\*\* = duplicate for B-30 submitted as blind duplicate labeled as B-31  
dup\*\*\* = duplicate for B-10 submitted as blind duplicate labeled as B-66  
dup\*\*\*\* = duplicate for MW-26 submitted as blind duplicate labeled as MW-1  
dup\*\*\*\*\* = duplicate for B-30 submitted as blind duplicate labeled as B-99  
dup\*\*\*\*\* = duplicate for B-4 submitted as blind duplicate labeled as B-56  
dup\*\*\*\*\* = duplicate for B-7 submitted as blind duplicate labeled as B-81  
dup\*\*\*\*\* = duplicate for B-37 submitted as blind duplicate labeled as B-1  
TB-LB = trip blank



**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

		Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3- cd) pyrene	Naphthalene	Phenanthrene	Pyrene
Number of benzene rings		2	2	3	4	5	4	5	4	4	5	3	2	5	2	3	4
Well Identification	Date Sampled	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
CHEVRON																	
B-7	02/18/00	5.22	<1.00U	<5.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	16.3	<1.00U	<5.00U	17.6	<1.00U
	05/23/00	<10.0U	<10.0U	<10.0U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	17.2	<1.00U	<10.0U	13.6	<1.00U
dup*****	05/23/00	<10.0U	<10.0U	<10.0U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	20.9	<1.00U	<10.0U	15.8	<1.00U
	08/25/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/22/01	1.33	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<1.00U	<0.500U	4.64	<0.500U	<0.500U	2.82	<0.500U
	05/17/01	0.934	<0.500U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	2.59	<0.100U	<1.00U	0.564	<0.100U
	03/20/03	<2.00U	<2.00U	<2.00U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<2.00U	<2.00U	<0.100U	<2.00U	<2.00U	<0.250U
B-9	02/18/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/23/00	<5.00U	<5.00U	<5.00U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<5.00U	7.43	<0.100U	<5.00U	1.30	<5.00U
	08/25/00	2.60	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	8.40	<1.00U	<1.00U	1.33	<1.00U
	11/30/00	0.700	<0.100U	0.600	0.460	0.240	0.400	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	6.70	<0.100U	0.780	0.200	0.160
	02/22/01	1.78	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<1.00U	<0.500U	6.20	<0.500U	<1.00U	0.528	<0.500U
	05/17/01	1.50	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.200U	4.60	<0.100U	<0.500U	0.386	<0.100U
	09/19/01	1.08	0.240	<0.100U	<0.100U	<0.100U	<0.100U	0.120	<0.100U	<0.100U	0.100	<0.100U	4.00	0.100	0.260	0.780	0.100
	03/21/02	<0.500U	<0.500U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.500U	<0.100U	<0.500U	<0.100U	<0.100U
	09/24/02	1.40	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	5.09	<0.100U	<0.100U	0.358	<0.100U
	03/20/03	0.242	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.400U	<0.200U	0.508	<0.200U	<0.200U	<0.200U	<0.200U
B-10	02/18/00	3.58	<1.00U	<5.00U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.140	<0.200U	<1.00U	11.8	<0.100U	<5.00U	12.9	0.513
dup*****	02/18/00	4.83	<1.00U	2.90	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	1.95	15.9	<1.00U	<5.00U	23.4	1.85
	05/23/00	<25.0U	<5.00U	<5.00U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.101	<0.200U	<5.00U	11.9	<0.100U	<5.00U	12.7	0.818
	08/25/00	1.63	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	3.18	<1.00U	<5.00U	2.91	<1.00U
	11/30/00	1.42	<0.100U	0.320	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	2.24	<0.100U	0.980	0.160	0.120
	02/23/01	1.01	<0.100U	0.252	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	0.234	1.25	<0.100U	<5.00U	1.33	0.225
	05/17/01	0.635	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.200U	0.976	<0.100U	<0.500U	0.521	<0.100U
	09/19/01	0.420	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.100	<0.100U	<0.100U	<0.100U	0.200	0.300	0.100	0.360	<0.100U	0.240
	03/21/02	<0.500U	<0.500U	0.188	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	0.190	1.23	<0.100U	<0.500U	1.23	0.220
	09/24/02	1.04	0.132	1.49	<0.100U	<0.100U	0.170	<0.100U	0.189	<0.100U	<0.100U	<0.100U	1.32	<0.100U	0.717	1.34	0.245
	03/20/03	1.05	<0.100U	0.190	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	0.194	1.30	<0.100U	<2.00U	1.27	0.236

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>B-11</b>	02/18/00	1.75	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	2.15	<1.00U	<5.00U	1.53	<1.00U
	05/23/00	<5.00U	<5.00U	<5.00U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<5.00U	<0.100U	<5.00U	0.891	0.169
	08/25/00	1.35	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	2.47	<1.00U	<5.00U	1.76	<1.00U
	11/30/00	2.10	0.400	1.02	0.400	0.180	0.180	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	2.88	<0.100U	1.20	0.260	<0.100U
	02/22/01	<1.00U	<1.00U	0.106	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	1.12	<0.100U	<2.00U	0.815	<0.100U
	05/17/01	0.478	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.729	<0.100U	<1.00U	0.358	<0.100U
<b>B-14</b>	02/18/00	1.08	<0.100U	0.222	0.100	<0.100U	<0.100U	<0.100U	<0.100U	0.104	<0.200U	0.561	1.84	<0.100U	7.00	1.90	0.582
	05/23/00	<2.50U	<2.50U	0.185	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	0.467	<2.50U	<0.100U	<25.0U	1.36	0.621
	08/25/00	1.16	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	2.75	<1.00U	24.5	2.06	<1.00U
	11/30/00	0.920	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	2.60	<0.100U	0.980	<0.100U	<0.100U
	02/22/01	<1.00U	<1.00U	0.187	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	0.390	1.10	<0.100U	<5.00U	1.16	0.489
	05/17/01	0.738	<0.100U	0.106	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	0.341	0.966	<0.100U	1.72	0.892	0.338
<b>B-19</b>	03/20/03	1.69	<1.00U	<0.400U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.200U	5.44	<0.100U	<3.50U	6.62	<0.200U
<b>B-20</b>	03/20/03	0.32	<0.150U	<0.400U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.577	<0.100U	<0.300U	<0.250U	<0.100U
<b>B-21</b>	09/19/01	3.40	0.200	1.78	0.360	0.360	0.320	0.400	0.300	0.540	0.160	1.52	16.1	0.320	1.18	16.8	1.54
	03/21/02	<1.00U	<1.00U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	1.38	<0.100U	<2.00U	3.84	<0.100U
	09/24/02	2.30	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	6.66	<0.100U	<0.100U	4.15	<0.100U
	03/20/03	2.71	<2.00U	<2.00U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<2.00U	11.0	<0.100U	<4.00U	7.00	<0.100U
<b>B-28</b>	02/18/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	0.109	<0.100U	<0.100U
	05/23/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	08/25/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	11/30/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	02/23/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/17/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	09/20/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.100	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.100	<0.100U	<0.100U
	03/21/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	09/24/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	03/20/03	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

		Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
Number of benzene rings		2	2	3	4	5	4	5	4	4	5	3	2	5	2	3	4
Well Identification	Date Sampled	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
B-29	09/20/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	03/21/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	09/24/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	03/20/03	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
B-30	02/18/00	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.400U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	0.202
	05/23/00	<1.00U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.500U	<0.100U	<1.00U	0.105	<0.100U
	08/25/00	0.385	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.400U	<0.200U	0.530	<0.200U	<1.00U	0.423	<0.200U
	11/30/00	0.280	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.440	<0.100U	0.280	0.300	0.100
dup**	02/23/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	02/23/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/17/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.116	<0.100U	<0.200U	0.108	<0.100U
	09/20/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.100	<0.100U	0.100	<0.100U	<0.100U
dup	09/20/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.100	<0.100U	<0.100U	0.100	<0.100U	<0.100U	0.120	0.100	<0.100U	<0.100U
	03/21/02	0.162	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.312	<0.100U	<0.500U	0.157	0.114
	03/21/02	0.162	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.314	<0.100U	<0.500U	0.164	0.123
	09/24/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
dup*****	09/24/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	09/24/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.132	<0.100U	<0.100U
	03/20/03	0.142	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.133	<0.100U	<0.400U	0.132	<0.100U
	03/20/03	0.108	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.126	<0.100U	<0.400U	0.105	<0.100U
B-32	03/20/03	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.161	<0.100U	<0.200U	<0.100U	0.108
B-33	03/20/03	0.589	<0.200U	<0.200U	<0.200U	<0.200U	0.385	0.370	<0.200U	0.306	<0.400U	0.449	2.01	0.300	<1.00U	0.914	0.458
CR-1	09/20/01	0.520	<0.100U	<0.100U	<0.100U	0.120	0.100	0.140	0.100	<0.100U	0.120	<0.100U	1.94	0.140	0.300	0.160	<0.100U
	03/21/02	0.216	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.789	<0.100U	<0.500U	0.194	<0.100U
	09/24/02	1.40	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	5.32	<0.100U	0.887	0.660	<0.100U
	03/20/03	0.758	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	2.53	<0.100U	<1.30U	0.748	<0.100U

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3- cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>CR-8</b>	02/18/00	<0.200U	0.749	0.264	0.981	2.47	1.60	2.92	1.30	1.28	<0.400U	1.34	<0.200U	1.96	<0.200U	<0.200U	1.97
	05/23/00	<1.00U	<1.00U	0.223	0.232	0.610	0.460	0.981	0.331	0.326	<0.200U	0.270	<1.00U	0.613	<1.00U	<0.100U	0.458
	08/25/00	<0.200U	<0.200U	<0.200U	0.313	0.666	0.445	0.755	0.455	0.434	<0.400U	0.674	<0.200U	<0.200U	<0.200U	<0.200U	0.913
	11/30/00	<0.100U	<0.100U	<0.100U	<0.100U	0.120	<0.100U	0.160	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.100	<0.100U	<0.100U	0.180
	02/22/01	<0.100U	0.284	0.105	0.536	1.25	0.970	1.46	0.628	0.923	<0.200U	0.749	0.103	0.960	<0.200U	0.108	1.41
	05/16/01	<0.200U	<0.200U	<0.200U	<0.200U	0.389	0.301	0.459	<0.200U	0.229	<0.400U	0.371	<0.200U	0.326	<0.200U	<0.200U	0.472
<b>CR-9</b>	02/18/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/23/00	<0.100U	<0.100U	0.115	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	08/25/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	dup 08/25/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	11/30/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.160	0.120	<0.100U	<0.100U	<0.100U	<0.100U	0.120	<0.100U	<0.100U	0.100
	dup 11/30/00	<0.100U	<0.100U	<0.100U	0.140	0.260	0.260	0.400	0.300	0.200	<0.100U	0.160	<0.100U	0.320	<0.100U	<0.100U	0.240
	02/22/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/16/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	dup 05/16/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
<b>CR-11</b>	02/18/00	0.333	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.982	<0.100U	<1.00U	0.327	<0.100U
	05/23/00	<2.50U	<2.50U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<2.50U	<0.100U	<2.50U	<0.100U	<0.100U
	08/25/00	0.402	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	1.20	<0.100U	<0.200U	0.450	<0.100U
	11/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/22/01	0.208	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.457	<0.100U	<0.500U	<0.100U	<0.100U
	05/16/01	0.149	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.221	<0.100U	<1.00U	<0.100U	<0.100U

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

		Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
Number of benzene rings		2	2	3	4	5	4	5	4	4	5	3	2	5	2	3	4
Well Identification	Date Sampled	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>KINDER MORGAN</b>																	
<b>MW-8</b>	02/16/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	1.66	<0.100U	<0.100U
	05/31/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<2.50U	<0.100U	<0.100U
	08/24/00	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.400U	<0.200U	<0.200U	<0.200U	1.53	<0.200U	<0.200U
	12/01/00	0.240	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.680	0.140	0.160
	02/22/01	0.221	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<1.00U	0.104	<0.100U
	05/16/01	0.149	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.500U	<0.100U	<0.100U
	dup 05/16/01	0.128	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.500U	<0.100U	<0.100U
	09/21/01	0.160	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.260	0.100	<0.100U
	03/14/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U
	dup 03/14/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U
<b>MW-10</b>	09/27/02	0.148	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.700U	<0.100U	<0.100U
	03/18/03	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.600U	<0.100U	<0.100U
	dup 03/18/03	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.500U	<0.100U	<0.100U
	02/16/00	0.113	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<1.00U	<0.100U	<0.100U
	05/31/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<2.00U	<0.100U	<0.100U
<b>MW-11</b>	08/24/00	0.119	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	12/01/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.180	<0.100U	<0.100U
	02/22/01	0.134	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<1.00U	<0.100U	<0.100U
	05/16/01	0.104	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.500U	<0.100U	<0.100U
	02/16/00	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	<1.00U	<1.00U	410	<1.00U	<1.00U
<b>MW-11</b>	05/31/00	<20.0U	<20.0U	0.159	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<20.0U	<0.100U	555	0.256	<0.100U
	08/24/00	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	<1.00U	<1.00U	451	<1.00U	<1.00U
	12/01/00	0.200	0.120	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.300	<0.100U	<0.100U	0.160	<0.100U
	02/22/01	0.247	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<2.50U	<0.100U	411	0.184	<0.100U
	05/16/01	0.117	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.185	<0.100U	572	0.108	<0.100U

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3- cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>MW-13</b>	02/16/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/31/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	08/24/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	12/01/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	dup: 12/01/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	02/22/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/16/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
<b>MW-15</b>	02/17/00	0.118	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/30/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	08/24/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	12/01/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	02/22/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/16/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
<b>MW-21</b>	02/17/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/30/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	08/23/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	12/01/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	02/22/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/16/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
<b>MW-22</b>	02/17/00	<2.00U	<2.00U	<2.00U	<2.00U	<2.00U	<2.00U	<2.00U	<2.00U	<2.00U	<4.00U	<2.00U	<2.00U	<2.00U	356	<2.00U	<2.00U
	05/30/00	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	<1.00U	<1.00U	345	<1.00U	<1.00U
	08/23/00	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	<1.00U	<1.00U	386	<1.00U	<1.00U
	12/01/00	0.300	0.160	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.500	<0.100U	<0.100U	0.400	<0.100U
	02/21/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/16/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Number of benzene rings		Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
Well Identification	Date Sampled	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
MW-23	02/17/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/30/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	08/23/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	12/01/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	02/22/01	2.31	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	4.12	<1.00U	35.0	3.27	<1.00U
	05/16/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
MW-25	09/21/01	0.240	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.120	<0.100U	<0.100U
	03/14/02	0.172	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	09/27/02	0.194	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.400U	<0.100U	0.101
	03/18/03	0.163	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
MW-26	02/17/00	2.05	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	1.19	1.70	<1.00U	2.69	2.27	1.05
dup****	02/17/00	1.78	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	1.43	<1.00U	2.24	1.74	<1.00U
	05/30/00	<10.0U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	1.84	<1.00U	<20.0U	1.84	<1.00U
	08/23/00	2.27	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	1.23	1.92	<1.00U	<5.00U	2.39	<1.00U
dup	08/23/00	2.27	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	1.12	1.98	<1.00U	<1.00U	2.63	<1.00U
	12/01/00	0.840	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.580	0.320	<0.100U	0.380	<0.100U	0.360
	02/21/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/17/01	1.86	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	1.40	<1.00U	<2.00U	1.88	<1.00U
	09/18/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	03/13/02	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	09/27/02	1.61	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<1.00U	0.510	1.43	<0.500U	<2.50U	2.36	<0.500U
	03/18/03	1.07	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<1.00U	0.641	0.974	<0.500U	7.16	1.51	<0.500U
MW-28	02/16/00	2.68	<1.00U	<5.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	1.00	<2.00U	<1.00U	6.69	<1.00U	<1.00U	8.54	2.71
	05/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	08/24/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	12/01/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/21/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/16/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3- cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>MW-31</b>	02/16/00	<1.00U	<0.100U	<0.500U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.988	<0.100U	<0.500U	0.457	<0.100U
	05/30/00	<2.50U	<2.50U	<2.50U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<2.50U	<2.50U	<0.100U	<2.50U	<2.50U	<2.50U
	08/23/00	0.243	<0.100U	<0.500U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.666	<0.100U	<0.500U	0.463	<0.100U
	12/01/00	0.100	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.300	<0.100U	<0.100U	<0.100U	<0.100U
	02/22/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.568	<0.100U	<0.500U	0.363	<0.100U
	05/17/01	0.206	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.597	<0.100U	<1.00U	0.352	<0.100U
<b>MW-32</b>	02/16/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/30/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	08/23/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	12/01/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	4.12	<0.100U	<0.100U
	02/22/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/16/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
<b>MW-33</b>	02/16/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/30/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	08/24/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	11/30/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	02/22/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	0.222	<0.100U	<0.100U
	dup 02/22/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	0.161	<0.100U	<0.100U
	05/16/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	09/21/01	0.340	<0.100U	<0.100U	0.100	<0.100U	0.220	0.140	0.120	0.200	<0.100U	0.180	<0.100U	0.120	0.160	<0.100U	0.160
	03/14/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	09/27/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	03/18/03	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
<b>MW-34</b>	09/21/01	0.280	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.100	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.120	0.120	<0.100U	<0.100U
	03/14/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	09/27/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	03/18/03	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U



**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Number of benzene rings	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
			(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
MW-36	02/16/00	2	0.143	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/31/00	2	0.228	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.500U	<0.100U	<0.100U
	08/24/00	3	0.269	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.500U	<0.100U	<0.100U
	11/30/00	4	0.420	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.180	<0.100U	<0.100U
	02/21/01	5	0.304	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.500U	<0.100U	<0.100U
	05/16/01	4	0.247	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<1.00U	<0.100U	<0.100U
	09/21/01	4	0.240	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.140	<0.100U	<0.100U
	03/13/02	5	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	03/18/03	4	0.178	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.250U	<0.100U	<0.100U
MW-37	02/16/00	2	<2.50U	<2.50U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	0.158	3.02	<0.100U	<2.50U	0.605	0.214
	05/30/00	2	<2.50U	<2.50U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	0.126	<2.50U	<0.100U	<12.5U	0.451	0.153
	dup*** 05/30/00	2	<5.00U	<5.00U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	0.121	<5.00U	<0.100U	<5.00U	0.465	0.146
	08/24/00	3	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	1.25	<1.00U	<5.00U	<1.00U	<1.00U
	11/30/00	4	0.680	0.180	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.600	<0.100U	0.660	0.200	0.120
	02/21/01	4	0.183	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.228	<0.100U	<0.200U	<0.100U	<0.100U
	02/21/01 <sup>1</sup>	4	0.588	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.513	<0.100U	<5.00U	0.207	<0.100U
	05/16/01	4	0.401	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.327	<0.100U	<2.50U	0.146	<0.100U
	09/21/01	4	0.140	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.280	0.120	<0.100U
	03/13/02	5	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	09/27/02	4	<0.500U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.499	<0.100U	<1.70U	0.166	0.122
	dup 09/27/02	4	<1.00U	<1.00U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<1.00U	<0.100U	<2.00U	0.147	<0.100U
	03/18/03	4	0.435	<0.150U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.731	<0.100U	<2.70U	<0.100U	<0.100U
	MW-40 02/16/00	2	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/30/00	2	0.124	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.500U	<0.100U	<0.100U
	08/24/00	3	0.141	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	11/30/00	4	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	02/21/01	4	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/16/01	4	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	09/21/01	4	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.120	<0.100U	<0.100U	0.100	0.380	<0.100U	0.140	<0.100U	0.120	0.240
	03/13/02	5	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	09/27/02	4	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U
	03/18/03	4	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.150U	<0.100U	<0.100U

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Number of benzene rings		Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene	
Well Identification	Date Sampled	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	
CONOCOPHILLIPS																		
B-4	02/17/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	
	05/26/00	13.2	<5.00U	<5.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	1.19	17.3	<1.00U	<25.0U	28.4	2.24	
	dup***** 05/26/00	<50.0U	<1.00U	<10.0U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	1.20	<50.0U	<1.00U	<10.0U	20.9	1.72	
	08/28/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	
	11/29/00	2.50	<0.100U	0.620	0.140	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	1.60	2.54	<0.100U	8.80	4.72	1.24	
	02/20/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	
	09/18/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	
	03/13/02	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	
	09/26/02	2.16	<0.500U	<1.00U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<1.00U	0.889	3.42	<0.500U	<2.50U	4.26	0.859	
	03/17/03	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	
B-17	02/17/00	2.28	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	8.42	<1.00U	<5.00U	4.25	<1.00U	
	05/26/00	<20.0U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	10.1	<1.00U	<10.0U	5.33	<1.00U	
	08/28/00	2.92	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	10.5	<1.00U	<5.00U	7.10	<1.00U	
	11/29/00	1.72	0.340	0.180	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.320	5.50	<0.100U	0.880	4.96	0.260	
	02/23/01	2.36	<1.00U	0.139	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.200U	8.20	<0.100U	<2.00U	2.93	<0.200U	
	dup 02/23/01	2.52	<2.50U	0.236	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.200U	<2.50U	0.372	<2.50U	3.84	<0.200U	
	05/17/01	2.19	<1.00U	0.294	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.500U	7.83	<0.100U	<5.00U	4.24	<0.200U	
	dup 05/17/01	2.19	<1.00U	0.265	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.500U	8.25	<0.100U	<5.00U	4.14	<0.200U	
	B-18	02/17/00	1.41	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	3.39	<1.00U	<1.00U	1.83	<1.00U
		05/26/00	<5.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U
08/28/00		1.28	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	2.84	<1.00U	<1.00U	1.17	<1.00U	
11/29/00		0.220	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.440	<0.100U	<0.100U	0.220	<0.100U	
02/23/01		<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<1.00U	<0.500U	1.11	<0.500U	<0.500U	<0.500U	<0.500U	
05/17/01		<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<1.00U	<0.500U	0.529	<0.500U	<0.500U	<0.500U	<0.500U	

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Number of benzene rings		Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
Well Identification	Date Sampled	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
B-22	02/17/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/26/00	<25.0U	<5.00U	<5.00U	<2.00U	<2.00U	<2.00U	<2.00U	<2.00U	<2.00U	<4.00U	<5.00U	15.4	<2.00U	<25.0U	21.5	<5.00U
	08/28/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/29/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/20/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
B-35	02/17/00	11.0	<1.00U	5.15	1.19	<1.00U	<1.00U	<1.00U	<1.00U	1.10	<2.00U	8.29	30.0	<1.00U	<10.0U	35.8	4.33
	05/26/00	<50.0U	<1.00U	2.61	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	2.93	22.5	<1.00U	<20.0U	20.7	1.73
	08/28/00	6.77	<2.00U	0.807	0.123	<0.100U	<0.100U	<0.100U	<0.100U	0.127	<0.200U	1.12	13.7	<0.100U	<10.0U	8.35	0.584
	11/29/00	2.84	0.360	0.520	0.240	<0.100U	<0.100U	<0.100U	<0.100U	0.200	<0.100U	1.46	6.30	<0.100U	1.22	7.16	0.760
	02/23/01	8.44	<5.00U	<5.00U	0.304	<0.100U	0.102	<0.100U	<0.100U	0.330	<0.200U	<5.00U	16.2	<0.100U	<5.00U	17.3	1.15
	05/17/01	4.34	<1.00U	0.493	0.103	<0.100U	<0.100U	<0.100U	<0.100U	0.106	<0.200U	0.692	11.3	<0.100U	<5.00U	5.50	0.425
	09/20/01	2.92	0.360	0.680	0.200	<0.100U	0.120	<0.100U	<0.100U	0.200	<0.100U	1.20	6.74	<0.100U	1.00	10.0	0.700
	03/14/02	3.02	<0.200U	0.620	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	0.844	7.62	<0.100U	<1.00U	6.78	0.468
	09/26/02	4.76	<1.00	0.740	0.109	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	1.00	11.6	<0.100U	<4.00U	9.41	0.570
	03/18/03	3.46	<0.200U	0.493	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.400U	0.578	14.3	<0.200U	<3.60U	7.51	0.434
B-36	02/17/00	0.251	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.537	<0.100U	<1.00U	<0.500U	<0.100U
	05/26/00	<1.00	<1.00	<1.00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<1.00U	<1.00U	<0.100U	<5.00U	<1.00U	<0.100U
	08/28/00	<2.00U	<2.00U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<2.00U	<0.100U	<2.00U	<0.500U	<0.100U
	11/29/00	0.720	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	1.34	<0.100U	0.520	0.180	<0.100U
	02/23/01	<2.00U	<2.00U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<2.00U	<0.100U	<2.00U	<0.100U	<0.100U
	05/17/01	0.642	<0.500U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	1.91	<0.100U	<1.00U	<0.100U	<0.100U
	09/20/01	0.360	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.920	<0.100U	0.320	0.200	<0.100U
dup	09/20/01	0.320	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.880	<0.100U	0.300	0.100	<0.100U
	03/14/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.262	<0.100U	<0.500U	<0.100U	<0.100U
	09/26/02	<0.600U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	1.26	<0.100U	<1.60U	<0.100U	<0.100U
	03/18/03	0.240	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.811	<0.100U	<1.10U	<0.100U	<0.100U

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3- cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>B-37</b>	02/17/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.500U	<0.100U	<0.100U
dup*****	02/17/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.500U	<0.100U	<0.100U
	05/26/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<1.00U	<0.100U	<1.00U	<0.100U	<0.100U
	08/28/00	0.124	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.500U	<0.100U	<0.100U
	11/29/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	02/23/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.200U	0.128	<0.100U
	05/17/01	0.110	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U
	03/14/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U
	09/26/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.300U	<0.100U	<0.100U
	03/18/03	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.500U	<0.100U	<0.100U
dup	03/18/03	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.500U	<0.100U	<0.100U
<b>B-40</b>	02/17/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/26/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	08/28/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/29/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	02/20/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
<b>U-2</b>	02/17/00	0.140	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.224	<0.100U	<1.00U	0.104	<0.100U
	05/26/00	0.119	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.239	<0.100U	<2.00U	0.122	<0.100U
	08/28/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.173	<0.100U	<0.100U	<0.100U	<0.100U
	11/29/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	02/23/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	05/17/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	09/20/01	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
	03/14/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.500U	<0.100U	<0.100U
	09/26/02	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U
	03/18/03	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.900U	<0.100U	<0.100U

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3- cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>U-3</b>	02/17/00	0.142	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.170	<0.100U	<1.00U	<0.100U	<0.100U
	05/26/00	<0.500U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.119	<0.100U	<2.00U	<0.100U	<0.100U
	08/28/00	0.145	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.163	<0.100U	<1.00U	<0.100U	<0.100U
	11/29/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.120	<0.100U	0.160	<0.100U	<0.100U
	dup 11/29/00	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.120	<0.100U	<0.100U
	02/23/01	0.117	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.152	<0.100U	<0.500U	<0.100U	<0.100U
<b>U-4</b>	05/17/01	0.110	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	0.134	<0.100U	<0.500U	<0.100U	<0.100U
	05/26/00	<20.0U	<1.00U	<5.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	7.44	<1.00U	<10.0U	7.11	<1.00U
	08/28/00	5.05	<1.00U	1.32	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	11.6	<1.00U	<5.00U	12.4	1.17
	dup 08/28/00	4.47	<2.00U	<2.00U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	0.367	10.4	<0.100U	<2.00U	6.48	0.544
	11/29/00	1.66	<0.100U	0.660	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	0.220	3.38	<0.100U	0.760	1.92	0.340
	02/23/01	13.0	<12.5U	4.14	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	0.727	<1.00U	<2.50U	31.6	<0.500U	<12.5U	40.6	4.08
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	09/18/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	03/13/02	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	09/26/02	2.88	<2.50U	<2.50U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<2.50U	7.60	<0.100U	<5.00U	8.14	0.571
<b>U-5</b>	dup 09/26/02	3.40	<2.50U	<2.50U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<2.50U	8.72	<0.100U	<5.00U	9.70	0.842
	03/17/03	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	02/17/00	1.19	<0.100U	<0.500U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	2.63	<0.100U	<1.00U	1.42	<0.100U
	05/26/00	<5.00U	<5.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<1.00U	<2.00U	<1.00U	<5.00U	<1.00U	<5.00U	2.04	<1.00U
	08/28/00	<2.50U	<2.50U	<0.500U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	5.52	<0.100U	<2.50U	2.29	<0.100U
	11/29/00	0.800	0.100	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	2.02	<0.100U	2.60	1.06	<0.100U
	02/23/01	<2.00U	<2.00U	0.124	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.500U	3.28	<0.100U	<2.00U	1.64	<0.100U
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	09/18/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	09/26/02	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	03/18/03	<20.0U	<20.0U	<20.0U	1.08	<1.00U	<1.00U	2.54	<1.00U	1.89	<2.00U	<20.0U	36.0	<1.00U	<40.0U	55.0	11.3

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3- cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
U-10	03/18/03	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	0.345	<0.100U	<0.100U
U-11	03/18/03	0.711	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<0.500U	<1.00U	<0.500U	2.44	<0.500U	<2.00U	0.951	<0.500U
U-12	03/18/03	1.72	<0.200U	0.308	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.400U	0.384	7.94	<0.200U	<3.60U	3.91	0.541
P-1	03/18/03	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.200U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U	<0.100U
P-2	03/17/03	2.61	<0.500U	<0.500U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.200U	<0.400U	<0.500U	9.62	<0.200U	<3.00U	2.05	<0.200U

**NOTES:**

< = Less than the laboratory method reporting limit (MRL)

µg/l = Micrograms per Liter

ND = Not detected above the MRL

U = Analyte included in the analysis but not detected

2/00 and 5/00 data from IT Corporation

8/00, 11/00, 2/01 and 5/01 data from KHM Environmental Management, Inc.

IT Corp Data recorded as reported in Second Quarter 2000 Report

Analytes reported in alphabetical order

NS/F = Not sampled floating product present

NS/S = Not sampled sheen present

1 = Sample rerun outside of hold time due to low surrogate recovery reported in the initial sample as a result of an extraction error.

dup\* = duplicate for B-30 submitted as blind duplicate labeled as B-50

dup\*\*= duplicate for B-30 submitted as blind duplicate labeled as B-31

dup\*\*\*=duplicate for MW-37 submitted as blind duplicate labeled as MW-63

dup\*\*\*\*=duplicate for MW-26 submitted as blind duplicate labeled as MW-1

dup\*\*\*\*\*=duplicate for B-30 submitted as blind duplicate labeled as B-99

dup\*\*\*\*\*=duplicate for B-4 submitted as blind duplicate labeled as B-56

dup\*\*\*\*\*=duplicate for B-7 submitted as blind duplicate labeled as B-81

dup\*\*\*\*\*=duplicate for B-37 submitted as blind duplicate labeled as B-1

dup\*\*\*\*\*=duplicate for B-10 submitted as blind duplicate labeled as B-66

PAHs by EPA Method 8270M-SIM

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>CHEVRON</b>											
<b>B-7</b>	02/18/00	0.0280	0.122	0.00107	0.00660	0.0134	0.00425	<0.000200U	0.00125	<0.00100U	0.0234
	05/23/00	0.0268	0.228	<0.00100U	0.0264	0.0441	0.0115	<0.000400U	0.00193	<0.00100U	0.0863
dup*****	05/23/00	0.0276	0.259	<0.00100U	0.0304	0.0510	0.0137	<0.000400U	0.00211	<0.00100U	0.104
	08/25/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/22/01	0.0310	0.0719	<0.00100U	<0.00100U	0.00311	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.00513
	05/17/01	0.0364	0.0587	<0.00100U	<0.00100U	0.00157	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.0100U
	03/20/03	0.0275	0.0642	<0.00100U	<0.00100U	0.0209	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
<b>B-9</b>	05/23/00	0.0177	0.139	<0.00100U	0.0176	0.0286	0.00848	<0.000400U	0.00123	<0.00100U	0.0616
	08/25/00	0.0116	0.0534	<0.00100U	0.00270	0.00750	0.00214	<0.000200U	<0.00100U	<0.00100U	0.0228
	11/30/00	0.0108	0.153	0.00149	0.0159	0.0354	0.0114	<0.000200U	0.00125	<0.00100U	0.0823
	02/22/01	0.0173	0.0460	<0.00100U	<0.00100U	0.00213	<0.00100U	<0.000200U	0.00127	<0.00100U	<0.00500U
	05/17/01	0.0208	0.0706	<0.00100U	0.00444	0.00634	0.00241	<0.00100U	<0.00100U	<0.00100U	0.0161
	09/19/01	0.0161	0.0753	<0.00100U	0.00256	0.00993	0.00266	<0.000200U	<0.00100U	<0.00100U	0.0136
	03/21/02	0.0105	0.0488	<0.00100U	0.00257	0.00683	0.00398	<0.000200U	<0.00100U	<0.00100U	0.0506
	09/24/02	0.0185	0.0469	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	03/20/03	0.00992	0.0401	<0.00100U	0.00165	0.00421	0.00317	<0.000200U	<0.00100U	<0.00100U	0.0283
<b>B-10</b>	02/18/00	0.0367	0.337	<0.00100U	0.0355	0.0572	0.0202	<0.000200U	<0.00100U	<0.00100U	0.0965
	02/18/00	0.0394	0.375	0.00141	0.0448	0.0745	0.0270	<0.000200U	0.00525	<0.00100U	0.123
dup*****	05/23/00	0.0354	0.211	<0.00100U	0.0265	0.0384	0.0115	<0.000400U	0.00229	<0.00100U	0.0631
	08/25/00	0.0314	0.0657	<0.00100U	0.00199	0.00366	0.00141	<0.000200U	0.00105	<0.00100U	0.0177
	11/30/00	0.0307	0.0946	<0.00100U	0.00590	0.00800	0.00257	<0.000200U	0.00131	<0.00100U	0.0165
	02/23/01	0.0323	0.0611	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00184	<0.00100U	<0.00500U
	05/17/01	0.0395	0.0567	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.0100U
	09/19/01	0.0234	0.194	<0.00100U	0.0249	0.0466	0.0161	<0.000800U	0.00104	<0.00100U	0.0793
	03/21/02	0.0301	0.0644	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	09/24/02	0.0290	0.0607	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	03/20/03	0.0327	0.0620	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
<b>B-11</b>	02/18/00	0.0386	0.985	0.00408	0.130	0.214	0.0959	<0.000200U	0.0034	<0.00100U	0.356
	05/23/00	0.0219	0.236	<0.00100U	0.0258	0.0407	0.0172	<0.000400U	0.00233	<0.00100U	0.0732
	08/25/00	0.0292	0.0809	<0.00100U	0.00543	0.00765	0.00398	<0.000200U	<0.00100U	<0.00100U	0.0273
	11/30/00	0.0277	0.113	<0.00100U	0.00986	0.0127	0.00575	<0.000200U	0.00146	<0.00100U	0.0288
	02/22/01	0.0234	0.0573	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	05/17/01	0.0291	0.0553	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	0.0100

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>B-14</b>	02/18/00	0.0367	0.297	<0.00100U	0.0290	0.053	0.0403	<0.000200U	0.00134	<0.00100U	0.0874
	05/23/00	0.0327	0.155	<0.00100U	0.0152	0.0264	0.0186	<0.000400U	0.00168	<0.00100U	0.0421
	08/25/00	0.0300	0.0774	<0.00100U	0.00175	0.00339	0.00568	<0.000200U	0.00113	<0.00100U	0.0207
	11/30/00	0.0292	0.0724	<0.00100U	<0.00100U	<0.00200U	0.00326	<0.000200U	0.00124	<0.00100U	<0.00500U
	02/22/01	0.0299	0.0603	<0.00100U	<0.00100U	0.00202	0.00102	<0.000200U	0.00104	<0.00100U	0.00696
	05/17/01	0.0373	0.0553	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.0100U
<b>B-19</b>	03/20/03	0.0453	0.0693	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
<b>B-20</b>	03/20/03	0.0107	0.0459	<0.00100U	0.00109	0.00389	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.00501
<b>B-21</b>	09/19/01	0.0306	0.107	<0.00100U	0.00833	0.0107	0.00322	<0.000200U	<0.00100U	<0.00100U	0.0259
	03/21/02	0.0405	0.0662	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	0.00109	0.00852
	09/24/02	0.0412	0.0695	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	03/20/03	NA	0.0740	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
<b>B-28</b>	02/18/00	0.0122	0.422	0.00368	0.0437	0.104	0.0496	<0.000200U	0.00156	<0.00100U	0.165
	05/23/00	0.00956	0.245	0.00144	0.0258	0.0468	0.0205	<0.000400U	0.00277	<0.00100U	0.0913
	08/25/00	0.00530	0.120	<0.00100U	0.00825	0.0152	0.00565	<0.000200U	0.00134	<0.00100U	0.0504
	11/30/00	0.0179	0.459	<0.00100U	0.0421	0.0640	0.0303	<0.000200U	0.00271	<0.00100U	0.149
	02/23/01	0.00756	0.131	<0.00100U	0.00896	0.0142	0.00555	<0.000200U	0.00181	<0.00100U	0.0363
	05/17/01	0.00561	0.0914	<0.00100U	0.00498	0.00737	0.00272	<0.00100U	0.00199	<0.00100U	0.0200
	09/20/01	0.0434	0.0821	<0.00100U	0.00166	0.00546	<0.00100U	<0.000200U	0.00109	<0.00100U	0.00782
	03/21/02	0.00407	0.0692	<0.00100U	0.00311	0.0115	0.00292	<0.000200U	<0.00100U	<0.00100U	0.0148
	09/24/02	0.00298	0.0519	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00244	<0.00100U	<0.00500U
	03/20/03	0.00220	0.0489	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00164	<0.00100U	<0.00500U
<b>B-29</b>	09/20/01	0.0110	0.292	<0.00100U	0.0286	0.0531	0.0264	<0.000200U	0.00385	<0.00100U	0.122
	03/21/02	0.00126	0.0600	<0.00100U	<0.00100U	0.00372	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.00710
	09/24/02	<0.00100U	0.0601	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00103	0.00102	<0.00500U
	03/20/03	<0.00100U	0.0593	<0.00100U	<0.00100U	0.00263	<0.00100U	<0.000200U	0.00143	<0.00100U	<0.00500U



**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
 Willbridge Terminals  
 Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>B-30</b>	02/18/00	0.0185	0.327	0.0355	0.0269	0.0671	0.0482	<0.000200U	0.00265	<0.00100U	0.238
	05/23/00	0.0141	0.117	0.00978	0.00904	0.0713	0.0108	<0.000400U	0.00267	<0.00100U	0.0527
	08/25/00	0.0221	0.0497	0.0146	0.00153	0.0176	0.00449	<0.000200U	<0.00100U	<0.00100U	0.0632
	11/30/00	0.0175	0.0513	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00103	<0.00100U	0.0116
	02/23/01	0.0144	0.0704	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
dup**	02/23/01	0.0140	0.0670	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	05/17/01	0.0177	0.0477	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	0.00175	<0.00100U	0.0100
	09/20/01	0.00211	0.0825	0.00167	0.00347	0.0208	0.0161	<0.000200U	0.00190	<0.00100U	0.0308
dup	09/20/01	0.0138	0.0564	<0.00100U	<0.00100U	0.00218	<0.00100U	<0.000200U	0.00110	<0.00100U	<0.00500U
	03/21/02	0.0177	0.0438	0.00823	0.00111	0.00533	0.00227	<0.000200U	<0.00100U	<0.00100U	0.0191
dup*****	03/21/02	0.0210	0.0489	0.00302	0.00142	0.00698	0.00458	<0.000200U	<0.00100U	<0.00100U	0.0220
	09/24/02	0.0126	0.0495	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00197	0.00126	<0.00500U
dup*****	09/24/02	0.0124	0.0501	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	03/20/03	0.0158	0.0483	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
dup*	03/20/03	0.0144	0.0486	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
<b>B-32</b>	03/20/03	0.00367	0.0429	<0.00100U	0.00110	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
<b>B-33</b>	03/20/03	0.00483	0.0430	<0.00100U	0.00437	0.0114	0.0124	<0.000200U	<0.00100U	<0.00100U	0.0223
<b>CR-1</b>	09/20/01	0.0143	0.0606	<0.00100U	0.00203	0.00468	0.00283	<0.000800U	0.00118	<0.00100U	0.00846
	03/21/02	0.00173	0.0188	<0.00100U	0.00113	0.00397	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.0163
	09/24/02	0.00204	0.0274	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.00609
	03/20/03	0.0119	0.0300	<0.00100U	0.00156	0.0112	0.00211	<0.000200U	<0.00100U	<0.00100U	0.0179
<b>CR-8</b>	02/18/00	0.0827	0.762	0.00345	0.0578	0.127	0.0997	<0.000200U	0.00321	<0.00100U	0.404
	05/23/00	0.0256	0.342	0.00312	0.0228	0.0684	0.0365	<0.000800U	0.00204	<0.00100U	0.155
	08/25/00	0.0203	0.105	<0.00100U	0.00697	0.0151	0.0101	<0.000200U	<0.00100U	<0.00100U	0.0442
	11/30/00	0.0167	0.0890	<0.00100U	0.00565	0.0149	0.00781	<0.000200U	0.00158	<0.00100U	0.0331
	02/22/01	0.0215	0.116	<0.00100U	0.00485	0.0123	0.00666	<0.000200U	<0.00100U	<0.00100U	0.0288
	05/16/01	0.0135	0.0374	<0.00100U	0.00128	0.00231	0.00147	<0.00100U	<0.00100U	<0.00100U	<0.0100U

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
 Willbridge Terminals  
 Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>CR-9</b>	02/18/00	0.0167	0.236	<0.00100U	0.0194	0.0286	0.0156	<0.000200U	0.00187	<0.00100U	0.0769
	05/23/00	0.00298	0.0413	<0.00100U	0.00300	0.00381	0.00188	<0.000200U	0.00112	<0.00100U	0.00893
	08/25/00	0.00160	0.0305	<0.00100U	<0.00100U	0.00143	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.0100U
dup	08/25/00	0.00160	0.0305	<0.00100U	<0.00100U	0.00170	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.0165
	11/30/00	0.00162	0.0222	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00283	<0.00100U	0.00503
dup	11/30/00	<0.00100U	0.0222	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00114	<0.00100U	<0.00500U
	02/22/01	<0.00100U	0.0235	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	05/16/01	0.00142	0.0291	<0.00100U	<0.00100U	0.00246	<0.00100U	<0.00100U	<0.00100U	<0.00100U	0.0100U
dup	05/16/01	0.00145	0.0339	<0.00100U	0.00151	0.00205	<0.00100U	<0.00100U	<0.00100U	<0.00100U	0.0100U
<b>CR-11</b>	02/18/00	0.0656	0.440	0.00559	0.0252	0.0571	0.0296	<0.000200U	0.00453	<0.00100U	0.123
	05/23/00	0.0493	0.382	0.00659	0.0358	0.0685	0.0391	<0.000400U	0.00321	<0.00100U	0.168
	08/25/00	0.0631	0.0834	<0.00100U	0.00101	0.00325	0.00137	<0.000200U	0.00183	<0.00100U	0.0179
	11/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/22/01	0.0536	0.126	<0.00100U	0.00104	0.00356	<0.00100U	<0.000200U	0.00324	<0.00100U	0.00784
	05/16/01	0.0587	0.111	<0.00100U	0.00362	0.00628	0.00314	<0.00100U	0.00243	<0.00100U	0.0193

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>KINDER MORGAN</b>											
<b>MW-8</b>	02/16/00	0.00974	0.0566	<0.00100U	0.00396	0.00476	0.00569	<0.000200U	<0.00100U	<0.00100U	0.0344
	05/31/00	0.00348	0.0226	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.00788
	08/24/00	0.0136	0.0381	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.00799
	12/01/00	0.0177	0.0710	0.00236	0.00195	0.00272	0.00250	<0.00200U	0.00239	<0.00100U	0.0207
	02/22/01	0.0111	0.0249	<0.00100U	0.00130	0.00234	<0.00100U	<0.00200U	<0.00500U	<0.00100U	0.00720
	05/16/01	0.00942	0.0308	<0.00100U	<0.00100U	0.00119	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.0100U
	dup 05/16/01	0.00931	0.0316	<0.00100U	<0.00100U	0.00135	<0.00100U	<0.00100U	<0.00100U	<0.00100U	0.0208
	09/21/01	0.0168	0.0637	0.00141	0.00219	0.00350	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.0138
	03/14/02	0.00198	0.0213	<0.00100U	<0.00100U	0.00376	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.00824
	dup 03/14/02	0.00281	0.0220	<0.00100U	<0.00100U	0.00337	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.0115
	09/27/02	0.0116	0.0592	0.00130	0.00258	0.00514	0.00294	<0.000200U	<0.00100U	<0.00100U	0.0230
	03/18/03	0.00412	0.0408	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.00597
	dup 03/18/03	0.00352	0.0408	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.00810
	<b>MW-10</b>	0.0311	0.266	<0.00100U	0.0250	0.0493	0.0256	<0.000200U	<0.00100U	<0.00100U	0.113
	05/31/00	0.0158	0.199	<0.00100U	0.0155	0.0292	0.0182	<0.000200U	0.00179	<0.00100U	0.0756
	08/24/00	0.0196	0.0518	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00130	<0.00100U	0.00549
<b>MW-11</b>	12/01/00	0.0284	0.103	<0.00100U	0.00424	0.00704	0.00437	<0.00200U	0.00125	<0.00100U	0.0181
	02/22/01	0.0222	0.0670	<0.00100U	0.00169	0.00331	0.00102	<0.000200U	<0.00500U	<0.00100U	0.00893
	05/16/01	0.0199	0.0729	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.0100U
	02/16/00	0.0677	0.398	<0.00100U	0.0344	0.0672	0.0786	<0.000200U	0.00134	<0.00100U	0.168
	05/31/00	0.0595	0.454	<0.00100U	0.0291	0.0577	0.0705	0.000201	0.00296	<0.00100U	0.153
<b>MW-13</b>	08/24/00	0.0509	0.111	<0.00100U	0.00484	0.00828	0.0210	<0.000200U	0.00315	<0.00100U	0.0203
	12/01/00	0.0478	0.125	<0.00100U	0.00719	0.0114	0.0372	<0.00200U	0.00438	<0.00100U	0.0311
	02/22/01	0.0509	0.113	<0.00100U	0.00590	0.0110	0.0399	<0.00200U	<0.00500U	<0.00100U	0.0310
	05/16/01	0.0455	0.0816	<0.00100U	0.00184	0.00388	0.0300	<0.00100U	<0.00100U	<0.00100U	0.0158
	02/16/00	0.017	0.305	<0.00100U	0.0285	0.0438	0.0235	<0.000200U	<0.00100U	<0.00100U	0.130
<b>MW-13</b>	05/31/00	0.0115	0.411	<0.00100U	0.0264	0.0409	0.0228	<0.000200U	0.00200	<0.00100U	0.114
	08/24/00	0.00331	0.0854	<0.00100U	0.00500	0.00817	0.00373	<0.000200U	0.00431	<0.00100U	0.0207
	12/01/00	0.00384	0.0784	<0.00100U	0.00494	0.00752	0.00319	<0.00200U	0.00146	<0.00100U	0.0201
	dup 12/01/00	0.00465	0.0795	<0.00100U	0.00504	0.00682	0.00344	<0.00200U	0.00162	<0.00100U	0.0207
	02/22/01	0.00146	0.0621	<0.00100U	0.00409	0.00581	0.00237	<0.00200U	<0.00500U	<0.00100U	0.0176
	05/16/01	0.00174	0.0523	<0.00100U	0.00218	0.00308	0.00169	<0.00100U	<0.00100U	<0.00100U	0.0123

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
 Willbridge Terminals  
 Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>MW-15</b>	02/17/00	0.00170	0.0874	<0.00100U	0.00651	0.00546	0.00206	<0.000200U	<0.00100U	<0.00100U	0.0219
	05/30/00	<0.00100U	0.0941	<0.00100U	0.00600	0.00597	0.00322	<0.000200U	<0.00100U	<0.00100U	0.0298
	08/24/00	<0.00200U	0.141	<0.00100U	0.00989	0.00879	0.00420	<0.000200U	0.00481	<0.00100U	0.0388
	12/01/00	0.00316	0.148	<0.00100U	0.0133	0.0120	0.00697	<0.000200U	0.00115	<0.00100U	0.0534
	02/22/01	0.00129	0.108	<0.00100U	0.00840	0.00951	0.00664	<0.000200U	<0.00500U	<0.00100U	0.208
	05/16/01	<0.00100U	0.0681	<0.00100U	0.00126	0.00154	0.00113	<0.00100U	<0.00100U	<0.00100U	0.0246
<b>MW-21</b>	02/17/00	0.00400	0.188	0.00219	0.00777	0.0091	0.00988	<0.000200U	<0.00100U	<0.00100U	0.0459
	05/30/00	0.00599	0.335	0.00701	0.0196	0.0248	0.0247	<0.000200U	0.00185	<0.00100U	0.126
	08/23/00	0.00339	0.185	<0.00100U	0.00202	0.00295	0.00126	<0.000200U	0.00153	<0.00100U	0.0140
	12/01/00	0.00344	0.141	0.00148	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00176	<0.00100U	0.0140
	02/22/01	0.00350	0.184	<0.00100U	0.00117	<0.00200U	<0.00100U	<0.000200U	<0.00500U	<0.00100U	0.0107
	05/16/01	0.00471	0.0219	<0.00100U	<0.00100U	0.00127	0.00103	<0.00100U	<0.00100U	<0.00100U	0.0182
<b>MW-22</b>	02/17/00	0.0928	0.251	<0.00100U	0.0121	0.00834	0.0391	<0.000200U	0.00121	<0.00100U	0.0492
	05/30/00	0.0945	0.244	<0.00100U	0.00970	0.00950	0.0216	<0.000200U	0.00242	<0.00100U	0.0388
	08/23/00	0.104	0.194	<0.00100U	0.00125	0.00201	0.00695	<0.000200U	0.00274	<0.00100U	<0.00500U
	12/01/00	0.0831	0.295	<0.00100U	0.00199	0.00213	0.0105	<0.000200U	0.00300	<0.00100U	0.0265
	02/21/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/16/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
<b>MW-23</b>	02/17/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/30/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	08/23/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/30/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	02/22/01	0.00909	0.0582	<0.00100U	0.00175	0.00817	0.00441	<0.000200U	<0.00500U	<0.00100U	0.00983
	05/16/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
<b>MW-25</b>	09/21/01	0.0563	0.0958	<0.00100U	0.00339	0.00365	0.00411	<0.000200U	<0.00100U	<0.00100U	0.0258
	03/14/02	0.0406	0.115	<0.00100U	0.00573	0.00832	0.00969	<0.000200U	<0.00100U	0.00115	0.0278
	09/27/02	0.116	0.186	<0.00100U	0.00606	0.00897	0.00990	<0.000200U	<0.00100U	<0.00100U	0.0334
	03/18/03	0.0386	0.0440	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00115	0.00110	<0.00500U

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
 Willbridge Terminals  
 Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>MW-26</b> dup****	02/17/00	0.0474	0.0943	<0.00100U	0.00468	0.00368	0.00342	<0.000200U	<0.00100U	<0.00100U	0.0141
	02/17/00	0.0487	0.0904	<0.00100U	0.00434	0.00496	0.00312	<0.000200U	<0.00100U	<0.00100U	0.0422
	05/30/00	0.0443	0.102	<0.00100U	0.00453	0.00501	0.00492	<0.000200U	<0.00100U	<0.00100U	0.0162
	08/23/00	0.0530	0.0594	<0.00100U	0.00218	0.00249	0.00228	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	08/23/00	0.0576	0.0642	<0.00100U	0.00227	0.00384	0.00228	<0.000200U	<0.00100U	<0.00100U	0.00791
	12/01/00	0.0526	0.0620	<0.00100U	0.00158	<0.00200U	0.00254	<0.000200U	0.00116	<0.00100U	0.00796
	02/21/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/17/01	0.0590	0.0678	<0.00100U	0.00221	0.00170	0.00225	<0.00100U	<0.00100U	<0.00100U	0.0120
	09/27/02	0.0450	0.0524	<0.00100U	0.00123	<0.00200U	0.00220	<0.000200U	<0.00100U	<0.00100U	0.0169
	03/18/03	0.0205	0.0670	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	0.00109	<0.00500U
<b>MW-28</b>	02/16/00	<0.00100U	0.00803	<0.00100U	<0.00100U	0.00200	0.00387	<0.000200U	<0.00100U	<0.00100U	0.0172
	05/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	08/23/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	11/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/21/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/16/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
<b>MW-31</b>	02/16/00	0.00504	0.0160	<0.00100U	<0.00100U	0.00222	0.00135	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	05/30/00	0.00664	0.0190	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	08/23/00	0.0181	0.0200	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	12/01/00	0.0134	0.0179	<0.00100U	<0.00100U	<0.00200U	0.00280	<0.000200U	<0.00100U	<0.00100U	<0.00200U
	02/22/01	0.0148	0.0228	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00500U	<0.00100U	0.00723
	05/17/01	0.0150	0.0210	<0.00100U	<0.00100U	<0.00100U	0.00244	<0.00100U	<0.00100U	<0.00100U	0.0132
<b>MW-32</b>	02/16/00	<0.00100U	0.0189	<0.00100U	0.00297	0.00399	0.00309	<0.000200U	<0.00100U	<0.00100U	0.00603
	05/30/00	0.00147	0.0268	<0.00100U	0.00195	0.00430	0.00159	<0.000200U	<0.00100U	<0.00100U	0.00686
	08/23/00	<0.00100U	0.0147	<0.00100U	<0.00100U	0.00251	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	12/01/00	0.00193	0.0142	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00120	<0.00100U	<0.00200U
	02/22/01	<0.00100U	0.00921	<0.00100U	0.00119	<0.00200U	<0.00100U	<0.000200U	<0.00500U	<0.00100U	<0.00500U
	05/16/01	<0.00100U	<0.0100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.0100U

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
MW-33	02/16/00	0.00842	0.0768	<0.00100U	0.00162	0.00423	0.00368	<0.000200U	<0.00100U	<0.00100U	0.00746
	05/30/00	0.00655	0.111	<0.00100U	0.00179	0.00338	0.00154	<0.000200U	<0.00100U	<0.00100U	0.00721
	08/24/00	0.0103	0.227	<0.00100U	0.00104	0.00246	<0.00100U	<0.000200U	0.00259	<0.00100U	<0.00500U
	11/30/00	0.0580	0.563	<0.00100U	0.00223	0.00343	<0.00100U	<0.000400U	0.00163	<0.00100U	0.00882
	02/22/01	0.0142	0.0910	<0.00100U	0.00179	0.00339	0.00103	<0.000200U	<0.00500U	<0.00100U	0.00944
	dup 02/22/01	0.0142	0.104	<0.00100U	0.00188	0.00390	0.00155	<0.000200U	<0.00500U	<0.00100U	0.0110
	05/16/01	0.0178	0.184	<0.00100U	<0.00100U	0.00128	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00500U
	09/21/01	0.0100	0.0757	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00151	<0.00100U	<0.00500U
	03/14/02	0.00975	0.0722	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.000200U	<0.00100U	0.00202	<0.00500U
	09/27/02	0.0302	0.356	<0.00100U	0.00206	0.00303	0.00136	<0.000200U	<0.00100U	<0.00100U	0.0205
	03/18/03	0.00867	0.0401	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	0.00140	<0.00500U
MW-34	09/21/01	0.0697	0.381	0.00239	0.0143	0.144	0.0146	<0.000200U	0.00146	<0.00100U	0.104
	03/14/02	0.0376	0.178	<0.00100U	0.00582	0.0132	0.00549	<0.000200U	<0.00100U	0.00151	0.0321
	09/27/02	0.162	0.670	0.00164	0.0264	0.0676	0.0226	<0.000200U	0.00130	<0.00100U	0.126
	03/18/03	0.0148	0.0934	<0.00100U	0.00602	0.00763	0.00541	<0.000200U	<0.00100U	0.00113	0.0210
MW-36	02/16/00	0.0146	0.0575	<0.00100U	0.00413	0.00614	0.00355	<0.000200U	<0.00100U	<0.00100U	0.0131
	05/31/00	0.0149	0.0512	<0.00100U	0.00180	0.00308	<0.00100U	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	08/24/00	0.0187	0.0570	<0.00100U	<0.00100U	0.00222	<0.00100U	<0.000200U	0.00111	<0.00100U	0.0108
	11/30/00	0.0225	0.0701	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00147	<0.00100U	<0.00500U
	02/21/01	0.0201	0.0560	<0.00100U	0.00151	0.00280	<0.00100U	<0.000200U	<0.00500U	<0.00100U	0.00677
	05/16/01	0.0297	0.0826	<0.00100U	<0.00100U	0.0169	<0.00100U	<0.00100U	<0.00100U	<0.00100U	0.0149
	09/21/01	0.0168	0.0541	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00108	<0.00100U	<0.00500U
	03/13/02	0.00442	0.0252	<0.00100U	<0.00100U	0.00297	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.0122
	03/18/03	0.00541	0.0316	<0.00100U	0.00122	0.00306	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.00629
MW-37	02/16/00	0.0184	0.0748	<0.00100U	0.00721	0.0118	0.00469	<0.000200U	<0.00100U	<0.00100U	0.0184
	05/30/00	0.0199	0.0567	<0.00100U	0.00356	0.00572	0.00180	<0.000200U	0.00158	<0.00100U	0.0111
	dup*** 05/30/00	0.0189	0.0586	<0.00100U	0.00408	0.00637	0.00205	<0.000200U	<0.00100U	<0.00100U	0.0121
	08/24/00	0.0227	0.0453	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00158	<0.00100U	0.00598
	11/30/00	0.0221	0.0693	<0.00100U	0.00419	0.00605	0.00353	<0.000200U	0.00123	<0.00100U	0.0123
	02/21/01	0.0223	0.0404	<0.00100U	0.00153	0.00206	<0.00100U	<0.000200U	<0.00500U	<0.00100U	0.00526
	05/16/01	0.0209	0.0403	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.00100U	<0.0100U
	09/21/01	0.0222	0.0432	<0.00100U	0.00127	<0.00200U	0.00147	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	09/27/02	0.0190	0.0429	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.000200U	<0.000200U	<0.00500U
	dup 09/27/02	0.0194	0.0423	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.00923
	03/18/03	0.00864	0.0259	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000400U	<0.00100U	0.00141	<0.00500U

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
 Willbridge Terminals  
 Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>MW-40</b>	02/16/00	0.0221	0.185	<0.00100U	0.0202	0.0289	0.0254	<0.000200U	<0.00100U	<0.00100U	0.0669
	05/30/00	0.0250	0.107	<0.00100U	0.00783	0.0107	0.00837	<0.000200U	<0.00100U	<0.00100U	0.0245
	08/24/00	0.0270	0.123	<0.00100U	0.00162	0.00316	0.00141	<0.000200U	0.00385	<0.00100U	0.0160
	11/30/00	0.0319	0.144	<0.00100U	0.00433	0.00734	0.00491	<0.000200U	0.00187	<0.00100U	0.0178
	02/21/01	0.0387	0.119	<0.00100U	0.00375	0.00607	0.00330	<0.000200U	<0.00500U	<0.00100U	0.0183
	05/16/01	0.0239	0.102	<0.00100U	0.00224	0.00314	0.00193	<0.000200U	<0.00100U	<0.00100U	0.00862
	09/21/01	0.0248	0.106	<0.00100U	0.00306	0.00343	0.00254	<0.000200U	0.00232	<0.00100U	0.0107
	03/13/02	0.0126	0.0538	<0.00100U	0.00197	0.00336	0.00194	<0.000200U	<0.00100U	<0.00100U	0.0124
	09/27/02	0.0281	0.219	<0.00100U	0.00881	0.0104	0.00808	<0.000200U	<0.00100U	<0.00100U	0.0250
	03/18/03	0.0174	0.0485	<0.00100U	0.00135	<0.00200U	0.00130	<0.000200U	<0.00100U	<0.00100U	0.00869

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>CONOCOPHILLIPS</b>											
<b>B-4</b>	05/26/00	0.0350	0.245	<0.00100U	0.0275	0.0425	0.0140	<0.000200U	<0.00100U	<0.00100U	0.0750
dup*****	05/26/00	0.0367	0.259	<0.00100U	0.0283	0.0443	0.0147	<0.000200U	<0.00100U	<0.00100U	0.0785
	08/28/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/29/00	0.0316	0.106	<0.00100U	0.00532	0.00968	0.00285	<0.000200U	0.00165	<0.00100U	0.0176
	02/20/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	09/26/02	0.0308	0.0999	<0.00100U	0.00541	0.00885	0.00272	<0.000200U	0.00129	<0.00100U	0.0259
<b>B-17</b>	02/17/00	0.0579	0.549	<0.00100U	0.0910	0.140	0.0676	<0.000400U	0.00152	<0.00100U	0.215
	05/26/00	0.0509	0.195	<0.00100U	0.0191	0.0290	0.0171	<0.000200U	0.00126	<0.00100U	0.0485
	08/28/00	0.0532	0.113	<0.00100U	0.00279	0.00417	0.00660	<0.000200U	<0.00100U	<0.00100U	0.0120
	11/29/00	0.0525	0.111	<0.00100U	0.00217	0.00695	0.00636	<0.000200U	0.00220	<0.00100U	0.00979
	02/23/01	0.0519	0.0821	<0.00100U	0.00130	0.00302	0.00470	<0.000200U	<0.00100U	<0.00100U	0.00966
dup	02/23/01	0.0511	0.0885	<0.00100U	0.00305	0.00691	0.00535	<0.000200U	0.00119	<0.00100U	0.0143
	05/17/01	0.0656	0.125	<0.00100U	0.00518	0.00746	0.00812	<0.00100U	<0.00100U	<0.00100U	0.0287
dup	05/17/01	0.0650	0.114	<0.00100U	0.00406	0.00546	0.00718	<0.00100U	0.00126	<0.00100U	0.0150
<b>B-18</b>	02/17/00	0.0223	0.507	<0.00100U	0.0797	0.110	0.0293	<0.000400U	0.00158	<0.00100U	0.174
	05/26/00	0.0228	0.203	<0.00100U	0.0211	0.0313	0.00922	<0.000200U	<0.00100U	<0.00100U	0.0558
	08/28/00	0.0221	0.130	0.00111	0.00563	0.00684	0.00315	<0.000200U	<0.00100U	<0.00100U	0.0270
	11/29/00	0.0171	0.128	<0.00100U	0.00238	0.00451	0.00120	<0.000200U	0.00153	<0.00100U	0.0157
	02/23/01	0.0256	0.118	<0.00100U	0.00538	0.0107	0.00294	<0.000200U	<0.00200U	<0.00200U	0.0506
	05/17/01	0.0372	0.138	<0.00100U	0.00774	0.00959	0.00310	<0.00100U	0.00106	0.00101	0.0309
<b>B-22</b>	02/17/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/26/00	0.0255	0.126	<0.00100U	0.0105	0.0187	0.00561	<0.000200U	<0.00100U	<0.00100U	0.0385
	08/28/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/29/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/20/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
<b>B-35</b>	02/17/00	0.0602	0.480	<0.00100U	0.0893	0.122	0.0828	<0.000400U	0.00164	<0.00100U	0.311
	05/26/00	0.0102	0.116	<0.00100U	0.00786	0.0114	0.00264	<0.000200U	0.00130	<0.00100U	0.0233
	08/28/00	0.0377	0.128	0.00153	0.00467	0.00612	0.00643	<0.000200U	<0.00100U	<0.00100U	0.0339
	11/29/00	0.0468	0.131	<0.00100U	0.00316	0.00691	0.00619	<0.000200U	0.00212	<0.00100U	0.0208
	02/23/01	0.0347	0.0816	<0.00100U	0.00200	0.00380	0.00305	<0.000200U	0.00100	<0.00100U	0.0308
	05/17/01	0.0504	0.153	<0.00100U	0.0107	0.0141	0.0106	<0.00100U	<0.00100U	<0.00100U	0.0511
	09/20/01	0.0344	0.0901	<0.00100U	0.00178	0.00420	0.00160	<0.000200U	<0.00100U	<0.00100U	0.00632
	03/14/02	0.0335	0.308	<0.00100U	0.0463	0.0534	0.0298	<0.000200U	0.00139	0.00145	0.146
	09/26/02	0.0296	0.225	<0.00100U	0.0298	0.0314	0.0147	<0.000200U	0.00131	<0.00100U	0.0816
	03/18/03	0.0387	0.0958	<0.00100U	0.00155	0.00422	0.00277	<0.000200U	<0.00100U	<0.00100U	0.00700



**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>B-36</b>	02/17/00	0.0105	0.168	<0.00100U	0.0222	0.0306	0.00779	<0.000200U	<0.00100U	<0.00100U	0.0551
	05/26/00	0.0105	0.120	<0.00100U	0.00819	0.0120	0.00251	<0.000200U	<0.00100U	<0.00100U	0.0250
	08/28/00	0.0224	0.156	<0.00100U	0.00784	0.00876	0.00322	<0.000200U	<0.00100U	<0.00100U	0.0474
	11/29/00	0.0223	0.130	<0.00100U	0.00525	0.00834	0.00171	<0.000200U	0.00202	<0.00100U	0.0171
	02/23/01	0.0488	0.174	<0.00100U	0.00371	0.00666	0.00142	<0.000200U	0.00234	<0.00100U	0.0244
	05/17/01	0.0387	0.476	<0.00100U	0.0572	0.0696	0.0165	<0.00100U	0.00301	<0.00100U	0.138
	09/20/01	0.0185	0.0861	<0.00100U	0.00154	0.00302	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.00761
	dup 09/20/01	0.0204	0.0974	<0.00100U	0.00294	0.00411	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.0132
	03/14/02	0.00840	0.0901	<0.00100U	0.00874	0.0114	0.00271	<0.000200U	<0.00100U	<0.00100U	0.0294
	09/26/02	0.0170	0.109	<0.00100U	0.00688	0.00910	0.00440	<0.000200U	<0.00100U	<0.00100U	0.0334
	03/18/03	0.00402	0.0409	<0.00100U	0.00234	0.00393	0.00144	<0.000200U	<0.00100U	<0.00100U	0.00729
	<b>B-37</b>	02/17/00	0.369	<0.00100U	0.0159	0.0297	0.00705	<0.000200U	0.00159	<0.00100U	0.0544
	dup*****	02/17/00	0.327	<0.00100U	<0.00100U	<0.00200U	0.00236	<0.000200U	<0.00100U	<0.00100U	<0.00500U
	05/26/00	0.418	0.0920	<0.00100U	0.00526	0.0131	0.00234	<0.000200U	<0.00100U	<0.00100U	0.0215
	08/28/00	0.897	0.227	<0.00100U	0.00462	0.00938	0.00209	<0.000200U	<0.00100U	<0.00100U	0.0303
	11/29/00	0.391	0.0990	<0.00100U	0.00221	0.00608	<0.00100U	<0.000200U	0.00132	<0.00100U	0.0120
	02/23/01	0.198	0.0747	<0.00100U	<0.00100U	0.00339	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.0170
	05/17/01	0.521	0.168	<0.00100U	0.00408	0.00984	0.00164	<0.00100U	<0.00100U	<0.00100U	0.0355
	03/14/02	0.0869	0.252	<0.00100U	0.0170	0.0409	0.00746	<0.000200U	<0.00100U	<0.00100U	0.0764
	09/26/02	0.117	0.119	<0.00100U	0.00603	0.0100	0.00625	<0.000200U	<0.00100U	<0.00100U	0.0348
	03/18/03	0.0758	0.121	<0.00100U	0.00829	0.0178	0.00429	<0.000200U	<0.00100U	0.00222	0.0539
	dup 03/18/03	0.0683	0.0958	<0.00100U	0.00572	0.0115	0.00288	<0.000200U	<0.00100U	0.00141	0.0364
	<b>B-40</b>	02/17/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/26/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	08/28/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/29/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	02/20/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>U-2</b>	02/17/00	0.0186	0.0632	<0.00100U	0.00363	0.0116	0.00499	<0.000200U	<0.00100U	<0.00100U	0.0241
	05/26/00	0.0110	0.0503	<0.00100U	0.00137	0.00537	0.00145	<0.000200U	<0.00100U	<0.00100U	0.0109
	08/28/00	0.0119	0.0503	0.00120	0.00109	0.00377	0.00169	<0.000200U	<0.00100U	<0.00100U	0.0147
	11/29/00	0.00729	0.0499	<0.00100U	0.00158	0.00314	0.00109	<0.000200U	0.00105	<0.00100U	0.0131
	02/23/01	0.00887	0.0373	<0.00100U	<0.00100U	0.00935	0.00173	<0.000200U	<0.00100U	<0.00100U	0.0212
	05/17/01	0.00953	0.0427	<0.00100U	0.00129	0.00916	0.00257	<0.00100U	<0.00100U	<0.00100U	0.0205
	09/20/01	0.00680	0.0397	<0.00100U	<0.00100U	0.00421	<0.00100U	<0.000200U	<0.00100U	<0.00100U	0.00700
	03/14/02	0.0108	0.0534	<0.00100U	0.00168	0.00666	0.00183	<0.000200U	<0.00100U	<0.00100U	0.0436
	09/26/02	0.00678	0.0443	<0.00100U	<0.00100U	0.00277	<0.00100U	<0.000200U	0.00127	<0.00100U	0.0116
	03/18/03	0.00998	0.0487	<0.00100U	0.00100	0.00583	0.00111	<0.000200U	<0.00100U	<0.00100U	0.0398
<b>U-3</b>	02/17/00	0.0421	0.194	<0.00100U	0.0241	0.0171	0.0225	<0.000200U	0.00102	<0.00100U	0.268
	05/26/00	0.0400	0.171	<0.00100U	0.0149	0.0116	0.0182	<0.000200U	0.00145	<0.00100U	0.139
	08/28/00	0.0365	0.124	<0.00100U	0.00704	0.00673	0.0212	<0.000200U	0.00202	<0.00100U	0.103
	11/29/00	0.0428	0.170	<0.00100U	0.00994	0.00949	0.0167	<0.000200U	0.00342	<0.00100U	0.107
	dup 11/29/00	0.0413	0.172	<0.00100U	0.00996	0.00932	0.0149	<0.000200U	0.00284	<0.00100U	0.0973
	02/23/01	0.119	0.631	<0.0100U	0.170	0.107	303	<0.000800U	<0.0100U	<0.00100U	1.47
	05/17/01	0.0450	0.111	<0.00100U	0.00359	0.00439	0.00427	<0.00100U	0.00170	<0.00100U	0.0258
<b>U-4</b>	05/26/00	0.0188	0.101	<0.00100U	0.00367	0.00749	0.00268	<0.000200U	<0.00100U	<0.00100U	0.0149
	08/28/00	0.0198	0.0930	<0.00100U	<0.00100U	0.00214	0.00129	<0.000200U	<0.00100U	<0.00100U	0.0150
	dup 08/28/00	0.0189	0.0922	<0.00100U	<0.00100U	0.00299	0.00131	<0.000200U	<0.00100U	<0.00100U	0.0157
	11/29/00	0.0198	0.0911	<0.00100U	<0.00100U	<0.00200U	<0.00100U	<0.000200U	0.00194	<0.00100U	0.00895
	02/23/01	0.0216	0.0802	<0.00100U	<0.00100U	<0.00200U	<0.0102	<0.000200U	<0.00100U	<0.00100U	0.00587
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	09/26/02	0.0183	0.106	<0.00100U	0.00432	0.0105	0.00484	<0.000200U	0.00180	<0.00100U	0.0377
dup	09/26/02	0.0183	0.106	<0.00100U	0.00403	0.00976	0.00379	<0.000200U	0.00128	<0.00100U	0.0313

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
U-5	02/17/00	0.0127	0.164	<0.00100U	0.0175	0.0456	0.0189	<0.000200U	<0.00100U	<0.00100U	0.933
	05/26/00	0.0104	0.0748	<0.00100U	0.00225	0.00912	0.00370	<0.000200U	<0.00100U	<0.00100U	0.286
	08/28/00	0.0109	0.219	<0.00100U	0.00759	0.0216	0.0143	<0.000200U	0.00165	<0.00100U	0.844
	11/29/00	0.0123	0.124	<0.00100U	0.00547	0.0216	0.00856	<0.000200U	0.00216	<0.00100U	0.825
	02/23/01	0.0126	0.101	<0.00100U	0.00692	0.0345	0.0140	<0.000200U	0.00100	<0.00100U	1.17
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	03/18/03	0.0110	0.170	<0.00100U	0.0129	0.0663	0.0158	<0.000400U	<0.00100U	0.00323	2.59
U-10	03/18/03	0.107	3.39	<0.0500U	0.313	0.403	0.176	0.000551	<0.0500U	<0.0500U	1.22
U-11	03/18/03	0.00942	0.372	<0.00100U	0.0297	0.0339	0.0336	0.000211	0.00153	<0.00100U	0.110
U-12	03/18/03	0.0323	0.136	<0.00100U	0.00600	0.00711	0.0228	<0.000200U	<0.00100U	<0.00100U	0.0338
P-1	03/17/03	0.0225	1.27	<0.0100U	0.216	0.239	0.0946	0.000604	<0.00100U	<0.00100U	0.625
P-2	03/17/03	0.0111	0.0783	<0.00100U	0.00232	0.00722	0.00288	<0.000200U	<0.00100U	0.00106	0.00979

**NOTES:**

< = Less than the laboratory method reporting limit (MRL)

U = Analyte included in the analysis but not detected

ND = Not detected above the laboratory MRL

NA = Not analyzed

NS/F = Not sampled floating product present

NS/S = Not sampled sheen present

2/00 and 5/00 data from IT Corporation

8/00, 11/00, 2/01 and 5/01 data from KHM Environmental Management, Inc.

Sample locations are shown on Figure 2

Analytical Reports are included in Attachment B

dup\* = duplicate for B-30 submitted as blind duplicate labeled as B-50

dup\*\*= duplicate for B-30 submitted as blind duplicate labeled as B-31

dup\*\*\*= duplicate for MW-37 submitted as blind duplicate labeled as MW-63

dup\*\*\*\*= duplicate for MW-26 submitted as blind duplicate labeled as MW-1

dup\*\*\*\*\*= duplicate for B-30 submitted as blind duplicate labeled as B-99

dup\*\*\*\*\*= duplicate for B-4 submitted as blind duplicate labeled as B-56

dup\*\*\*\*\*= duplicate for B-7 submitted as blind duplicate labeled as B-81

dup\*\*\*\*\*= duplicate for B-37 submitted as blind duplicate labeled as B-1

dup\*\*\*\*\*= duplicate for B-10 submitted as blind duplicate labeled as B-66

Total Metals Analysis by EPA 6000/7000 Series Methods

**APPENDIX B**

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**BORING LOGS**

1. *Chlorophyll a* (Chl *a*)

Received 10/11/2011

How many of the following are true?

Page 15 of 24

SAN# as above

Grey sandy Silt: 10% very fine sand non-plastic re. product odor

Brown Silty; 10% fine sand; trace shells and mollus; low plasticity

Stiff brown SLL; 5% fine sand; low plasticity, slight black orange mottle

Silt; SILT with grey and orange mottles; no odor; no steel

BOTTOM OF BORING = 24.0 FEET

DRILLING CO.: GEOTECH  
DRILLING METHOD: GEOPROBE  
SAMPLING METHOD: MACRO  
PROJECT NAME:  
LOCATION: CHEVRON LUBRICANTS  
PROJECT NO.: B15-300.1A

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
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IT CORPORATION

**COP0020415**



DEPTH IN FEET		SAMPLE RETAINED* PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. CHEV-HP-3	
										COORDINATES N _____ E _____	
										FIELD GEOLOGIST _____ N.W.H. DATE BEGAN 10-14-98	
										CHECKED BY _____ N.W.H. DATE FINISHED 10-14-98	
										APPROVED BY _____ GROUND SURFACE EL _____	
										TOTAL DEPTH 20.0	
										DESCRIPTION	
0										ASPHALT Deep/hard roadbed concrete fill?	0.5'
						DAMP WET		gw		GRAVEL Roadbed, occasional sand and silt	
						MOIST					3.0'
5								ml		Brown sandy SILT; 10% sand orange mottle	
										Brown sandy SILT; 10% fine sand	
10	*				25	SAT				Stiff brown, mottled SILT; with 10% fine sand, trace gravel and organics, no odor.	
	*				9	WET					
15										SILT as above; no product odor	
20										BOTTOM OF BORING = 20.0 FEET	
25											
30											
35											

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: CHEVRON LUBRICANTS N. OF TRUCK L. RACK  
 PROJECT NO.: B15-300.1A

DRAWN BY M.J.S. CHECKED BY \_\_\_\_\_ FILE NAME & \_\_\_\_\_



IT CORPORATION

COP0020417

BORING NO. CHEV-LS-1									
COORDINATES $\begin{matrix} N \\ E \end{matrix}$									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-13-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-13-98</u>									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>12.0'</u>									
DEPTH IN FEET	SAMPLE RETAINED* PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0							gw		FILL: GRAVEL 1.25'
									Gravel and road bed mixed with brown SAND; poorly sorted; grey sand; poorly sorted; 5% non plastic; strong product odor
5							sm		
									7.25'
							ml		Dark grey SAND; grading to dark grey silt; low plasticity; product odor strong; 10% fine sand; 8.0'
							sm		Silty SAND; 80% sand; 20% silt; poorly sorted
10									10.0'
							ml		Dark grey SILT; moderate plasticity; 10% sand; product odor strong
									BOTTOM OF BORING = 12.0 FEET
15									
20									
25									
30									
35									

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: BEACH  
 PROJECT NO.: 815-200.1A

DRAWN BY M. IS

CHECKED BY \_\_\_\_\_

FILE NAME & \_\_\_\_\_



ITT CORPORATION

COP0020418



BORING NO. CHEV-LS-2							
COORDINATES N _____ E _____							
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-13-98</u>							
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-13-98</u>							
APPROVED BY _____ GROUND SURFACE EL _____							
TOTAL DEPTH <u>12.0</u>							
DESCRIPTION							
DEPTH IN FEET	SAMPLE RETAINED* PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS PROFILE
0							
							9w
					Mat		
5					Mat		
					Wt		ml
10							
15							
20							
25							
30							
35							

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: BEACH  
 PROJECT NO.: B15-200.1A



ITT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	8-05-98	APPROVED BY		PROJECT NUMBER	

COP0020419

DEPTH IN FEET		SAMPLE RETAINED* PENETRATION (BLOWS/6")		RECOVERY		SAMPLE INTERVAL		P.I.D. (ppm)		MOISTURE CONTENT		DRILLING REMARKS		USCS		PROFILE		BORING NO. CHEV-LS-3	
																		COORDINATES N	
0																		FIELD GEOLOGIST N.W.H. DATE BEGAN 10-30-98	
																		CHECKED BY N.W.H. DATE FINISHED 10-30-98	
																		APPROVED BY GROUND SURFACE EL	
																		TOTAL DEPTH 16.0'	
																		DESCRIPTION	
																		Rock/Road bed	
																		Brown silty SAND, 15% silt; 50% coarse sand; 15% medium; 20% fine sand	
																		3.0'	
5																		Rock, crushed basalt.	
																		Crushed rock.	
																		Crushed rock; free product in tube and clinging to ??? rock; strong product odor.	
																		Crushed rock fill.	
																		Rock-hand probing	
																		9.0'	
10																		SILT, no recovery.	
																		Grey sandy SILT; 5% very fine sand, strong product odor.	
																		Dense moist; same as above	
15																		BOTTOM OF BORING = 16.0 FEET	
20																			
25																			
30																			
35																			

DRILLING CO.: CRISMAN  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: PRODUCT RECOVERY TRENCH; CHEVRON BEACH  
 PROJECT NO.: B15-200.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	8-06-99	APPROVED BY		DISK NUMBER	



ITT CORPORATION

COP0020420

DEPTH IN FEET		SAMPLE RETAINED* PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (60m)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. CHEV-LS-4			
										COORDINATES			
										FIELD GEOLOGIST	N.W.H.	DATE BEGAN	10-30-98
										CHECKED BY	N.W.H.	DATE FINISHED	10-30-98
										APPROVED BY		GROUND SURFACE EL	
										TOTAL DEPTH	12.0		
DESCRIPTION													
										sm	Roadbed-rock	0.5'	
										sm	SAND, brown silty, 15% silt 50% coarse sand; 25% medium 10% fine	2.75'	
										gw	Drain rock green geotextile; impermeable		
										ml	SILT	7.0'	
										sm	Grey silty SAND 5% silt	9.0'	
										ml	Grey sandy SILT; 5% fine sand; low plasticity, slight product odor	10.0'	
BOTTOM OF BORING = 12.0 FEET													

DRILLING CO.: CRISMAN  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: CHEVRON BEACH RECOVERY TRENCH  
 PROJECT NO.: B15-200.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	8-05-99	APPROVED BY			



IT CORPORATION

COP0020421

BORING NO. CHEV-RF-1									
COORDINATES $\begin{matrix} N \\ E \end{matrix}$									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-13-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-13-98</u>									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>12.0'</u>									
DESCRIPTION									
DEPTH IN FEET	SAMPLE RETAINED* PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (DOM)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	
0									
1.5							gw		1.5' Feels gravel base (ballast), crushed rock. Brown poorly sorted SAND; strong product odor. Gray black sand; 70% coarse sand, 15% fine; 5% silt.
5	*		40		Mst				
10	*		13		Wt Sol		sm		Dark gray SAND, moderate product odor; 5-10% silt, wet, saturated. Dark gray SAND, slight product odor.
15	*		5				ml		Gray SILT, slight product odor; no sand; below water table; feels dryish (moist) uniform.
BOTTOM OF BORING = 16.0 FEET									
20									
25									
30									
35									

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: CHEVRON BEACH SOUTHERN  
 PROJECT NO.: B15-200.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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IT CORPORATION

COP0020422

DEPTH IN FEET		SAMPLE RETAINED* PENETRATION (BLOWS/6")		RECOVERY		SAMPLE INTERVAL		P.I.D. (DDM)		MOISTURE CONTENT		DRILLING REMARKS		USCS		PROFILE		BORING NO. CHEV-RF-2	
																		COORDINATES N _____ E _____	
																		FIELD GEOLOGIST _____ N.W.H. DATE BEGAN _____ 10-13-98	
																		CHECKED BY _____ N.W.H. DATE FINISHED _____ 10-13-98	
																		APPROVED BY _____ GROUND SURFACE EL _____	
																		TOTAL DEPTH _____ 12.0	
																		DESCRIPTION	
0		*																GRAVEL rock fill	
5																		3.25'	
10		*																6" recovery, dark gray SILT, moderate product odor, no sand moderate plasticity	
15																		Poor recovery.	
20																		No Recovery	
25																			
30																			
35																		BOTTOM OF BORING = 16.0 FEET	

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: CHEVRON BEACH-MIDDLE  
 PROJECT NO.: B15-200.1A

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IT CORPORATION

COP0020423

DRILLING CO.: GEOTECH  
DRILLING METHOD: GEOPROBE  
SAMPLING METHOD: MACRO  
PROJECT NAME:  
LOCATION: CHEVRON BEACH NORTH OF DOCK  
PROJECT NO.: B15-200.1A

IT

**COP0020424**



BORING NO. GATX-RF-1						
COORDINATES N _____ E _____						
FIELD GEOLOGIST _____ N.W.H. DATE BEGAN _____						
CHECKED BY _____ N.W.H. DATE FINISHED _____						
APPROVED BY _____ GROUND SURFACE EL _____						
TOTAL DEPTH _____ 16.0'						
DESCRIPTION						
0						Rock base
					6	Mst
					59	
5						Sol
	*					
10						
	*					
15						
20						
25						
30						
35						

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: GATX DOCK  
 PROJECT NO: B15-100 1A



IT CORPORATION

DRAWN BY M.J.S. CHECKED BY \_\_\_\_\_ FILE NAME & \_\_\_\_\_

COP0020426



BORING NO. GATX-RF-2						
COORDINATES $\begin{matrix} N \\ E \end{matrix}$ _____						
FIELD GEOLOGIST <u>N.W.H.</u>		DATE BEGAN <u>10-29-96</u>				
CHECKED BY <u>N.W.H.</u>		DATE FINISHED <u>10-29-96</u>				
APPROVED BY _____		GROUND SURFACE EL. _____				
TOTAL DEPTH <u>16.0'</u>						
DESCRIPTION						
0						SAND/Beach, 70% medium, 10% coarse, 15% medium, 5% fine 1.0'
5		6	Mst			Brown SILT; high in roots and organics no product odor Moderate plasticity, red/brown mottle Brown silt same as above
		59				Grey SILT; 25-30% fine sand no product odor root traces
	*		Sol			Grey sandy SILT; few roots ~10% fine sand, mica flakes.
10						Fewer root traces/organics
	*					SILT; dense and dry, moist
15						Grey sandy SILT; same as above; no organics.
BOTTOM OF BORING = 16.0 FEET						
20						
25						
30						
35						

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: DIRECT PUSH  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: GATX DOCK  
 PROJECT NO.: B15-100.1A

DRAWN BY M.J.S. | CHECKED BY \_\_\_\_\_ | FILE NAME & \_\_\_\_\_



IT CORPORATION

COP0020427

BORING NO. GATX-RF-3									
COORDINATES N _____ E _____									
FIELD GEOLOGIST _____ N.W.H. DATE BEGAN 10-29-98									
CHECKED BY _____ N.W.H. DATE FINISHED 10-29-98									
APPROVED BY _____ GROUND SURFACE EL _____									
TOTAL DEPTH 14.0' DESCRIPTION									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	
0									
	*		6		Mst		sw		SAND beach
									2.0
							sm		Brown silty SAND; 5% silt; no product odor.
5					Mst				5.0
									SILT, brown, sandy, 10% medium sand root traces
	*		9		Mst		ml		Brown sandy SILT, root traces slight black orange gray mottle; 10% fine sand.
10					Wl				Grey sandy SILT; 10% fine sand, gray with brown/orange mottle
	*		6						Grey sandy SILT, 10% fine root traces
15									BOTTOM OF BORING = 14.0 FEET
20									
25									
30									
35									

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: PUSH PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: GATX BEACH  
 PROJECT NO: B15-100.1A



IT CORPORATION

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COP0020428



DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/5')	RECOVERY SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-LS-1	
									COORDINATES $\begin{matrix} N \\ E \end{matrix}$	
0									FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-15-98</u> CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-15-98</u> APPROVED BY _____ GROUND SURFACE EL _____ TOTAL DEPTH <u>16.0'</u>	
									DESCRIPTION	
5		*		5					ROCK 1.5	
10				9	Msl		sm	$\frac{V}{1}$	SAND, reddish brown; poorly graded; 10% silt; no product odor  Brown SAND; same as above  Grey SAND; same as above; product odor.  Grey SAND; strong odor as above.  No Recovery	
15				6					BOTTOM OF BORING = 16.0 FEET	
20										
25										
30										
35										

DRILLING CO.: GEOTECH  
DRILLING METHOD: GEOPROBE  
SAMPLING METHOD: MACRO  
PROJECT NAME:  
LOCATION: GATX BEACH S. OF PIER  
PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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COP0020430

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-UB-3	
										COORDINATES	
										FIELD GEOLOGIST	N.W.H.
										DATE BEGAN	3-31-99
										CHECKED BY	N.W.H.
										DATE FINISHED	
										APPROVED BY	
										GROUND SURFACE EL.	
										TOTAL DEPTH	12.0'
										DESCRIPTION	
0						Dp				▽ ASPHALT	1.0'
						Wt/Mst		gm		Rock and sand roadbed; large round rock with sand matrix	2.0
5		*		0.5		Mst				▽ Very fine SAND with 10-15% silt; brown	
						Mst				Very fine sand as above	
		*		0		Wt		sp		Very fine sand; grading coarser; brown; no product odor.	
						Wt				Brown sand; medium grained	
10						Sat				▽ Dark grey, black sand with 5% silt; trace gravel; heavy sheen; diesel odor; (no gravel) same as above; slight product odor.	
						Sat				Depth to water 9.1' below ground surface after sampling	
11.0		*		100		Sat		ml		Stiff; dark brown; grey SILT, low plasticity; occasional rootlets.	
										BOTTOM OF BORING = 12.0 FEET	
										Water at 12.45 feet	

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE. STORM SEWER  
 PROJECT NO.: B15-100.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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IT CORPORATION

COP0020431

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-UB-4	
										COORDINATES	
0										FIELD GEOLOGIST	N.W.H. DATE BEGAN 3-31-99
										CHECKED BY	N.W.H. DATE FINISHED
										APPROVED BY	GROUND SURFACE EL
										TOTAL DEPTH	12.0
										DESCRIPTION	
										ASPHALT	
						Mst		gw		GRAVEL: graded river rock.	1.0
						Wl		sw		SAND: clean, coarse grey with red and clear quartz grains; 20% quartz coarse	2.0
5		*			0	Wl				Sand as above	
								ml		Silt lense; 2" thick.	7.0
		*			0			sw			7.5
						Sat		ml		Brown silt with 5-10% fine sand.	9.0
10		*						sm		Block SAND, strong product odor (diesel) many wood fragments and trace gravel	10.0
		*			145	Sat				BOTTOM OF BORING = 12.0 FEET	
15											
20											
25											
30											
35											

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE. STORM SEWER  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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COP0020432

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-UB-5	
										COORDINATES	
0										FIELD GEOLOGIST	N.W.H.
										DATE BEGAN	4-1-99
										CHECKED BY	N.W.H.
										DATE FINISHED	
										APPROVED BY	
										GROUND SURFACE EL.	
										TOTAL DEPTH	12.0
										DESCRIPTION	
0								ml		ASPHALT	
1.0'								qw		ROCK (roadbed)	
2.0'										Brown silty SAND; 20% silt; no product odor.	
3.0'								sm			
4.5'										Grey green sandy SILT; very fine sand; faint product odor	
5.0'		*			140	Dry					
6.0'						Mst					
7.0'						Mst					
8.0'		*			185	Wt					
9.0'						Wt					
10.0'						Wt					
11.0'		*			177	Wt					
12.0'										BOTTOM OF BORING = 12.0 FEET	

DRILLING CO.: CASCADE  
 DRILLING METHOD: HAND AUGER  
 SAMPLING METHOD: BRASS TUBE  
 PROJECT NAME:  
 LOCATION: 10" WOOD VSP ABANDONED STORM SEWER  
 PROJECT NO.: B15-100.1A



II CORPORATION

DRAWN BY: M.J.S. | CHECKED BY: | FILE NAME &:

COP0020433

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.L.D. (dbm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-UB-6	
										COORDINATES	
										FIELD GEOLOGIST	N.W.H. DATE BEGAN 3-31-99
										CHECKED BY	N.W.H. DATE FINISHED
										APPROVED BY	GROUND SURFACE EL
										TOTAL DEPTH 12.0'	
										DESCRIPTION	
0								ml		ASPHALT 12"	
						Dp		gw		Coarse clean dark grey SAND with rock (roadbed)	1.0
						Dp					
						Mst				Brown to grey SAND; 10% coarse; 60% medium; 25% fine; trace silt	2.5
5		*			0	Mst		sw		SAND as above	
		*				Wt					
10		*			0	Wt		gw		SAND with fine to coarse gravel (ml) GRAVEL, fine, no product odor Hard object at 11.8 feet	10.0
										BOTTOM OF BORING = 12 FEET	
15											
20											
25											
30											
35											

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: STORM IN N BOUND FRONT  
 PROJECT NO.: B15-100.1A

DRAWN BY M.J.S. | CHECKED BY | FILE NAME &



IT CORPORATION

COP0020434



DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-UB-7	
										COORDINATES	
0										FIELD GEOLOGIST	N.W.H.
										DATE BEGAN	4-1-99
										CHECKED BY	N.W.H.
										DATE FINISHED	
										APPROVED BY	
										GROUND SURFACE EL	
										TOTAL DEPTH	20.0'
										DESCRIPTION	
0										ASPHALT	
										Gray	
										1.0'	
										Brown SAND with silt; 85% fine to medium sand with 15% silt	
										no product odor	
5		*			0	Dp		sm			
						Mst					
						Wt					
		*			1			ml		7.5'	
										SILT WITH SAND; brown, low plasticity silt, with 15% fine sand; no product odor.	
10						Wt		sm		9.5'	
										Grading to SILTY SAND.	
										SAND WITH SILT; brown.	
								ml		11.0'	
										Sandy SILT; 60% silt; 40% fine sand; brown, non-plastic; no product odor.	
15		*			15			sm		13.0'	
						Wt				Silty SAND; 5% silt.	
										SAND; block; 15% silt; fine gravel; no product odor.	
										FILL	
20										Block SAND; 10% coarse; 35% medium; 55% fine; trace fine gravel; faint product odor or organics.	
										TOTAL DEPTH = 20.0 FEET	
25											
30											
35											

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: 60" SANITARY IN GS ROOFING PARKING LOT  
 PROJECT NO.: B15-100.1A



IT CORPORATION

COP0020435

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-UB-8	
										COORDINATES N _____ E _____	
0										FIELD GEOLOGIST _____ N.W.H.	DATE BEGAN _____ 4-1-99
										CHECKED BY _____ N.W.H.	DATE FINISHED _____
										APPROVED BY _____	GROUND SURFACE EL. _____
										TOTAL DEPTH _____ 16.0	
										DESCRIPTION	
										ASPHALT	0.5'
										Brown medium to fine SAND; no product odor	
5						Mst					
						Mst					
		*			0	Mst		sm			
						Wt					
10		*			0.5					Brown SAND; as above. no product odor.	
						Sat				Brown SAND; as above.	
15		*			0	Sat				Dark brown SAND as above; no product odor.	
										BOTTOM OF BORING = 16.0 FEET	
20											
25											
30											
35											

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: 60" SANITARY NEAR ELF ATOCHEM  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
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COP0020436

DEPTH IN FEET		SAMPLE RETAINED* PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-HP-1			
										COORDINATES			
										FIELD GEOLOGIST	N.W.H.	DATE BEGAN	11-05-98
										CHECKED BY	N.W.H.	DATE FINISHED	
										APPROVED BY		GROUND SURFACE EL.	
										TOTAL DEPTH	24.0'		
DESCRIPTION													
0								qw	8.5'	ROCK	0.5'		
								sm		Brown silty SAND, 5% coarse; 15% medium; 50% fine 30% silt			
								ml	2.5'	Brown SANDY SILT; 40% sand; 60% silt			
									3.0'	Brown SILTY SAND; as above			
5								sm		Brown SILTY SAND; some as above			
	*			31				ml	8.50'	Grey SILTY SAND; some as above			
	*			47				ml	8.75'	Grey sandy SILT; 20% fine sand. SAND (organics 5% locally dense). 75% silt no product odor.			
10								ml	10.75'	Organics roots			
								ml	11.0'	Grey SANDY SILT			
	*			218				sm	13.0'	Grey SILTY SAND: 20% coarse, 50% medium; 15% fine, 15% silt, strong product odor			
15								sm		Grey SILTY SAND: some as above; moderate product odor			
								ol	18.5'	Organics, (wood and rootlets)			
								ml	19.0'	Grey SILT, moderate product odor, 10% fine sand; 5% organics			
20								ml		Grey SANDY SILT, moderate product odor no organics, no mica			
										Grey SANDY SILT; some as above			
25								BOTTOM OF BORING = 24.0 FEET					
30													
35													

DRILLING CO.:  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: OLD LOADING RACK  
 PROJECT NO.: B15-100.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	5-15-99	APPROVED BY			



IT CORPORATION

COP0020437

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-HP-2	
										COORDINATES	
0										FIELD GEOLOGIST	N.W.H. DATE BEGAN 11-05-98
										CHECKED BY	N.W.H. DATE FINISHED
										APPROVED BY	GROUND SURFACE EL.
										TOTAL DEPTH 24.0'	
										DESCRIPTION	
						Mst		gw		ASPHALT	2.5'
										Rock/Soil (Roadbed)	
						Mst		sm		Brown silty SAND; 40% medium sand; 20% fine sand; 30% silt	2.0'
						Mst		ml		Brown SILT with sand, non plastic, 20% fine sand; no product odor	3.5'
5						Mst		sm		Brown SAND with silt; some as 2.5-3.5'; no product odor.	
		*			17						
		*			11	Wt		ml		Brown SILT; non plastic; slight product odor, 10% very fine sand, liquifies.	8.5'
10						Wt				Grey SANDY SILT loose; non plastic, 15% fine sand; slight product odor	
						Wt					
						Wt		sm		Grey SAND, 20% coarse, 40% medium, 30% fine, 10% silt, slight product odor.	11.5'
15										Grey SAND, same as above	
										Grey SAND, same as above.	
20		*			23	Wt				Grey SAND, slight product odor.	20.5'
						Wt		ml		Grey SILT; 10% fine sand, firm, low plasticity	
										Grey SILT, non plastic, same as above; no product odor.	
25										BOTTOM OF BORING = 24.0 FEET	
30											
35											

DRILLING CO.: G. TECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE.  
 PROJECT NO.: 815-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-15-99	APPROVED BY		DATE	

COP0020438

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-HP-3			
										COORDINATES			
										FIELD GEOLOGIST	N.W.H.	DATE BEGAN	11-05-98
										CHECKED BY	N.W.H.	DATE FINISHED	
										APPROVED BY		GROUND SURFACE EL.	
										TOTAL DEPTH	28.0'		
										DESCRIPTION			
0										ROCK	5'		
								ml		Brown SANDY SILT, 20% medium sand, 10% fine sand.	1.5'		
								sm		Brown silty SAND: 20% coarse; 50% medium; 20% fine; 10% silt; no product odor.	3.0'		
								ml		Brown sandy SILT, non plastic, no product odor, 10% very fine sand, trace mica.	6.5'		
										Some as above. Slight product odor.			
					9	Mst		sm		Brown SAND: 10% coarse, 20% medium; 60% fine; 10% silt	12.5'		
10		*			13	Wt				Some as above. Slight product odor.	13.0'		
		*			8	Wt		ml		Grey SANDY SILT; 15% very fine sand.			
										Grey SAND: 30% coarse; 35% medium; 30% fine; 5% silt; moderate product odor.			
		*			13	Wt				Grey SAND; some as above; slight product odor.			
						Wt		sm					
15										Grey SAND; with organics; 20% coarse; 50% medium; 20% fine; 5% silt, 5% fine gravel, wood, organic debris.			
						Wt				Block silty SAND; same as above.	22.5'		
								ml		Grey sandy SILT, 15% fine sand, non plastic, no product odor.			
						Wt				Grey sandy SILT. Grading (color).	25.5 ±		
20								ml		Brown SANDY SILT: 5% fine; orange, mottled; low plasticity; no product odor; no mica; firm; dry.			
						Mst							
25										BOTTOM OF BORING = 28.0 FEET			
30													
35													

DRILLING CO.: G. TECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE.  
 PROJECT NO.: B15-100.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-15-99	APPROVED BY			



IT CORPORATION

COP0020439

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (bbm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-HP-4			
										COORDINATES			
										FIELD GEOLOGIST	N.W.H.	DATE BEGAN	11-04-98
										CHECKED BY	N.W.H.	DATE FINISHED	
										APPROVED BY		GROUND SURFACE EL	
										TOTAL DEPTH	28.0		
										DESCRIPTION			
0							Msl	gw		ROCK			
								gm		Rock/Sand fill; mica laminoc.	1.5'		
										Brown silty SAND; 5% silt; 40% coarse; 40% medium; 15% fine	2.0'		
5							Msl						
		*			8		Msl	sm		Fine silty brown SAND; 50% fine sand; 5% medium sand; 40% silt; micaceous			
10		*			1		Msl			Brown silty SAND; same as above.			
							Wl						
								ml		Grey sandy SILT. Grey sandy SILT; 15% fine sand; low plasticity; no product odor.	11.5'		
15								sm		Grey silty SAND; 30% coarse; 25% medium; 40% fine; 5% silt	14.0'		
								ml		Grey sandy SILT; 15% fine sand; low plasticity no product odor	16.0'		
							Wl			Grey silty SAND; (slight product odor); 30% coarse; 25% medium; 40% fine; 5% silt	18.0'		
20		*			4			sm		Grey silty SAND; 10% silt; 40% medium 30% coarse; 20% fine			
							Wl			Grey sandy SILT.	23.5'		
25								ml		Grey sandy SILT; 5% fine sand Non plastic; root traces; organics; no product odor; with mica			
30										BOTTOM OF BORING = 28.0 FEET			
35													

DRILLING CO.: G. TECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE. (NEAR SCALE)  
 PROJECT NO.: B15-100.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-15-98	APPROVED BY			



IT CORPORATION

COP0020440

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-HP-5	
										COORDINATES	
0										FIELD GEOLOGIST	N.W.H.
										DATE BEGAN	11-02-98
										CHECKED BY	N.W.H.
										DATE FINISHED	11-02-98
										APPROVED BY	
										TOTAL DEPTH	32.0
										GROUND SURFACE EL	
										DESCRIPTION	
0										ASPHALT	
1.0								gw		Crushed ROCK roadbed	
2.5											
5								sm		Coarse brown SILTY SAND; poorly sorted; 10% sil	
6.5											
10		*		9		MOIST					
15		*		9		WET					
20				9		WET					
25											
30											
35											
										BOTTOM OF BORING = 32.0 FEET	

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: 61ST AVE. (GATX SIDE)  
 PROJECT NO.: B15-100.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	10-05-99	APPROVED BY		DISK NUMBER	



IT CORPORATION

COP0020441

BORING NO. GATX-HP-6				COORDINATES $N$ _____ $E$ _____				
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE
0					DRY			
								ASPHALT
								ROCK roadbed
								1.0
	*		220		MOIST			
5	*		48		MOIST			
								Brown SANDY SILT; 10% fine sand; trace charcoal and rootlets
								As above no organics
								Brown SANDY SILT; as above; no product odor.
10	*		48		WET			
								Stiff; brown; SANDY SILT; 20% fine sand; (trace mica flakes)
15								
								Loose brown SANDY SILT; as above
								Grading less sand
20					WET			
								Grading more sand
								Brown SILTY SAND; 20% silt
								Brown SANDY SILT; 10% fine sand; non-plastic; no product odors
25					WET			
								Brown sandy SILT; loose; non plastic; 10% fine sand; no product odor.
								Grading more fine sand.
30					WET			
								35% very fine SAND; mica flakes
								Grading less SAND.
35					WET			
								Stiff brown SANDY SILT.
								35.0'
								Brown SILTY SAND; 15% silt; no product odor.

BOTTOM OF BORING = 36.0 FEET

DRILLING CO.: GEOTECH  
DRILLING METHOD: GEOPROBE  
SAMPLING METHOD: MACRO

PROJECT NAME:  
LOCATION: 61ST AVE.  
PROJECT NO.: B15-100.1A

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
DATE	10-05-99	APPROVED BY	REV. NUMBER



IT CORPORATION

COP0020442



BORING NO. GATX-HP-7						
COORDINATES <u>N</u> <u>E</u>						
FIELD GEOLOGIST <u>N.W.H.</u>		DATE BEGAN <u>11-04-98</u>				
CHECKED BY <u>N.W.H.</u>		DATE FINISHED <u>11-04-98</u>				
APPROVED BY <u></u>		GROUND SURFACE EL. <u></u>				
TOTAL DEPTH <u>32.0</u>						
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS
0						ASPHALT
						DESCRIPTION 0.5
						Roadbed ROCK/SILT/SAND
						2.0
					MOIST	Brown SANDY SILT; 95% silt 5% sand with rootlets; organics and trace diorcool; non plastic; no product odor.
5	*			45	MOIST	
					MOIST	Coarse brown SANDY SILT; 15% very fine sand; slight grey and orange mottle trace mica and organics
	*			82	WET	
10						17
						Brown SANDY SILT; mica flakes 10% fine sand; 10% silt; non plastic; no product odor.
15						
	*			80	WET	Brown SANDY SILT; as above.
20						Loose
					WET	
					WET	
25					WET	
						Brown SANDY SILT 20% fine sand; non-plastic; no product odor.
30					WET	
						Brown SANDY SILT; 5% fine sand; trace mica flakes; non-plastic; no product odor.
BOTTOM OF BORING = 32.0 FEET						
35						

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: 61ST AVE. & CULEBRA ST.  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	10-05-99	APPROVED BY			

COP0020443

BORING NO. GATX-HP-8					
COORDINATES <u>N</u> <u>E</u>					
FIELD GEOLOGIST <u>N.W.H.</u>		DATE BEGAN <u>11-04-98</u>			
CHECKED BY <u>N.W.H.</u>		DATE FINISHED <u>11-04-98</u>			
APPROVED BY _____		GROUND SURFACE EL _____			
TOTAL DEPTH <u>32.0'</u>					
DESCRIPTION					
0				gw	GRAVEL roadbed with silt and sand
					2.0'
				sm	Brown silty SAND; 10% silt; poorly sorted.
					3.5'
5	*	9	MOIST		Dark brown SANDY SILT with 15% medium fine sand; with grey and orange mottle; non-plastic; trace organics
	*		WET		Brown SILT with 10% fine sand; non plastic; no product odor.
10		34	WET		
	*		SAT		Loose; brown SANDY SILT; 15% fine sand; non plastic; trace mica.
15		8			Trace organics; root traces.
					$\nabla$
20			WET		
					Brown SANDY SILT as above
25			WET		Brown SANDY SILT; 10% fine SAND; non plastic; no product odor.
					Stiff grey SILT; 10% fine sand; non plastic; no product odor.
30					
					BOTTOM OF BORING = 32.0 FEET
35					

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: 61ST AVE. & CULEBRA  
 PROJECT NO: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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COP0020444



BORING NO. GATX-HP-10					
COORDINATES <u>N</u> <u>E</u>					
FIELD GEOLOGIST <u>N.W.H.</u>		DATE BEGAN <u>11-04-98</u>			
CHECKED BY <u>N.W.H.</u>		DATE FINISHED <u>11-04-98</u>			
APPROVED BY _____		GROUND SURFACE EL. _____			
TOTAL DEPTH <u>32.0</u>					
DESCRIPTION					
0				USCS	PROFILE
				gw	Crushed ROCK roadbed ROCK mixed with silt and sand. 1.5'
				ml	Dark brown sandy SILT with charcoal; rootlets and 10% fine to medium sand  Non plastic, no odor.  Brown SILT with fewer organics. 7.0'
				gw	Crushed drain ROCK with 20% brown silt and 10% sand; moderate product odor. 12.0'
				ml	Stiff, brown SANDY SILT; 15% fine sand; orange mottle; trace mica; faint product odor.  Grey SILT with trace sand; non plastic; moderate product odor.  SILT; as above.  Grey SANDY SILT; as above.  Coarse brown SANDY SILT; loose; non-plastic; no product odor.  Grey SANDY SILT; 20% fine sand; faint product odor.
BOTTOM OF BORING = 32.0 FEET					

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: CULEBRA AVE.  
 PROJECT NO: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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COP0020446

BORING NO. GATX-HP-11					
COORDINATES <u>N</u> <u>E</u>					
FIELD GEOLOGIST <u>N.W.H.</u>		DATE BEGAN <u>10-15-98</u>			
CHECKED BY <u>N.W.H.</u>		DATE FINISHED <u>10-15-98</u>			
APPROVED BY _____		GROUND SURFACE EL. _____			
TOTAL DEPTH <u>17.0'</u>					
DESCRIPTION					
0			DRY	gw	GRAVEL roadbed and fill material; brick; sand; silt
2.5					
5	6		MOIST	ml	Brown SANDY SILT; 15% fine sand; black and orange mottled; non plastic; no product odor.
					Brown SILT; 5% fine sand; trace organics; low plasticity; no product odor.
10	7		WET		Grey SANDY SILT; 5% fine sand; trace mica; moderate plasticity
					Grey SILT; as above
15					Stiff grey SILT; as above; 10% fine sand; low plasticity; no product odor.
					Refusal at 17.0 feet.
BOTTOM OF BORING = 17.0 FEET					
20					
25					
30					
35					

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: GATX MAINTENANCE AREA  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
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COP0020447

BORING NO. GATX-HP-12									
COORDINATES <span style="float: right;">N _____ E _____</span>									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>4-1-99</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED _____									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>16.0</u>									
DESCRIPTION									
0									ASPHALT 0.5'
									GRAVEL 1.0'
									Brown silty SAND; 70% medium; 25% fine; 5% silt; no product odor.
5	*								Brown SILTY SAND; as above; no product odor.
10									Brown SAND; as above; no product odor.
15									Slough; brown SAND
									Block SAND in shoe; faint organic odor; no product odor.
									BOTTOM OF BORING = 16.0 FEET
20									
25									
30									
35									

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: GS by 60" Sanitary and fence  
 PROJECT NO.: B15-100.1A

DRAWN BY M.J.S. CHECKED BY \_\_\_\_\_ FILE NAME & \_\_\_\_\_



IT CORPORATION

COP0020448

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-HP-13	
										COORDINATES	
										FIELD GEOLOGIST	N.W.H. DATE BEGAN 3-31-99
										CHECKED BY	N.W.H. DATE FINISHED
										APPROVED BY	GROUND SURFACE EL
										TOTAL DEPTH	20.0
										DESCRIPTION	
0								gw		ASPHALT SAND AND ROCK (roadbed).	1.0'
								sw		Clean SAND; brown. 5% silt; no product odor	
											4.0'
5		*			0	Mst		sm		Fine brown SILTY SAND 15% silt; non-plastic; no product odor	
		*			0	Wt				GRAVELLY SILT, 15% gravel; brown; no product odor.	
						Mst				Brown SAND; as above.	
10						Sal		ml		Brown SAND, very fine 40% silt	9.0'
						Sal				Brown silt 20% fine sand	
										Grey SILT; as above; no product odor	12.0'
								sm		Very fine SAND with 20% silt.	13.0'
15		*			46	Wt		sw		Brown SAND; medium grained.	
						Wt				GRAVEL fine	
						Wt				Black SAND; medium to fine; no product odor	
						Wt				Trace fine GRAVEL	
20	BOTTOM OF BORING = 20.0 FEET										
25											
30											
35											

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: By GS ROOFING  
 PROJECT NO.: BT5-100.1A



IT CORPORATION

DRAWN BY M.J.S. CHECKED BY FILE NAME &

COP0020449

**COP0020450**



DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-HS-2	
										COORDINATES $N$ $E$	
										FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-26-98</u>	
										CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>          </u>	
										APPROVED BY <u>          </u> GROUND SURFACE EL <u>          </u>	
										TOTAL DEPTH <u>8.0</u>	
										DESCRIPTION	
0								Qw	0.0	0.5	ROCK
		*			329	Msl					SAND: dark brown; grading downward to black; poorly sorted; 50% coarse; 30% medium to fine; 20% silt
					244	Wt		Sw			
		*				Wt					Black SAND, strong odor.
5											BOTTOM OF BORING = 4.0 FEET
10											
15											
20											
25											
30											
35											

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: DIRECT PUSH  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TK 2/S2 GATX SOUTH YARD  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY M.J.S. CHECKED BY            FILE NAME &           

COP0020451

# BORING NO. GATX-HS-3

COORDINATES

FIELD GEOLOGIST N.W.H. DATE BEGAN 10-26-95  
 CHECKED BY N.W.H. DATE FINISHED \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_ GROUND SURFACE EL. \_\_\_\_\_  
 TOTAL DEPTH 8.0'

## DESCRIPTION

0.5'	ROCK
	Dark brown SAND; poorly sorted; 40% coarse; 30% medium; 20% fine; 10% silt
	Black SAND; few quartz grains (white); 50% coarse; 20% medium; 15% fine; 15% silt
	Strong product odor
8.5'	Grey SILT; 90% silt; 10% fine sand; no mottling or root traces; stiff; low plasticity

BOTTOM OF BORING = 8.0 FEET

DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (p.p.m.)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE
0							gw	
	*			59	Mst			
	*			141	Wl		sm	
5								
					Mst		mt	
10								
15								
20								
25								
30								
35								

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TK 2/52 GATX SOUTH YARD  
 PROJECT NO.: B15-100 1A



ITT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	8-02-99	APPROVED BY		DISK NUMBER	

COP0020452

BORING NO. GATX-HS-4									
COORDINATES <u>N</u> <u>E</u>									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-26-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u></u>									
APPROVED BY <u></u> GROUND SURFACE EL. <u></u>									
TOTAL DEPTH <u>8.0'</u>									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.L.O. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0									
	*		6		Msl		qw		GRAVEL 0.5'
	*		59		Wt		sp		Brown, poorly graded SAND; 50% coarse; 25% medium; 15% fine sand; 10% silt; no product odor.
5									Faint product odor.
									SAND: 50% coarse; 25% medium; 15% fine; 10% silt
					Msl				Free product; thin consistency; filling 10-20% of pores; grey SILT. 10% fine sand low plasticity; petroleum hydrocarbons
10									
15									
20									
25									
30									
35									

DRILLING CO.: CRISMAN  
 DRILLING METHOD: PUSH PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TK 2/52 GATX SOUTH YARD  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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COP0020453

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-HP-1	
										COORDINATES N <u>          </u> E <u>          </u>	
										FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>11-03-98</u>	
										CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>          </u>	
										APPROVED BY <u>          </u> GROUND SURFACE EL <u>          </u>	
										TOTAL DEPTH <u>28.0</u>	
										DESCRIPTION	
0											ASPHALT
											1.0
								gw			Road gravel.
											1.5'
											Fine grey silty SAND; 10% coarse; 30% medium; 50% fine; 10% silt; no product odor
5						Dry					
						Mst					
								sm			Grey silty SAND; 20% coarse; 40% medium; 35% fine; 5% silt; no product odor
10	*				25	Mst					Grey silty SAND; fine to medium; 20% coarse; 5% silt; faint product odor.
											Grey silty SAND; 20% coarse; 40% medium; 35% fine; 5% silt
15											Some as above; strong product odor.
20	*				40	Wt					Strong product odor.
						Sol					Grey silty SAND; 20% coarse; 30% medium; 40% fine; 10% silt; strong product odor.
											Some as above; moderate product odor.
					15						
25						Wt					Grey silty SAND; 30% coarse; 40% medium; 20% fine; 10% silt.
						Wt					
								ml			Grey sandy SILT; 90% silt; 10% fine sand; and organics (root traces); non-plastic slight product odor
											26.5
										BOTTOM OF BORING = 28.0 FEET	
30											
35											

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE.  
 PROJECT NO.: B15-300.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-15-99	APPROVED BY		DISK NUMBER	


COP0020454





DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")		RECOVERY		SAMPLE INTERVAL		P.I.D. (ppm)		MOISTURE CONTENT		DRILLING REMARKS		USCS		PROFILE		BORING NO. TOS-HP-4		COORDINATES	
0																		FIELD GEOLOGIST N.W.H. DATE BEGAN 11-03-98		CHECKED BY N.W.H. DATE FINISHED	
																		APPROVED BY		GROUND SURFACE EL	
																		TOTAL DEPTH 32.0			
																		DESCRIPTION			
																		ASPHALT		0.5'	
																		Rock/soil roadbed.		1.5'	
																		Brown silty SAND: 60% fine sand; 10% medium sand; 30% silt			
5																		Brown silty SAND: 20% coarse; 50% medium; 20% fine; 10% silt; no product odor.			
10																		Brown silty SAND: 20% coarse; 15% fine; 30% medium; 15% silt; no product odor.			
15																		Brown silty SAND: 50% fine; 15% medium 15% coarse; 20% silt			
																		3" grey SILT; no sand; moderately plastic; wet; no product odor.		14.0'	
																		Brown silty SAND: 40% coarse; 30% medium; 20% fine; 10% silt		15.0'	
20																		Depth to water approximately 18.4 ft			
																		Brown SAND: 20% coarse; 60% medium; 15% fine; 5% silt.			
																		Gravel .25"			
																		Brown sand; 5% silt.			
25																		Same as above; no product odor.			
																		Grey SAND: 30% coarse; 50% medium; 20% fine; trace silt			
30																		Grey SAND; same as above			
																		Strong contact with grey SILT; some organics (wood)		30.0	
																		BOTTOM OF BORING = 32.0 FEET			
35																					

DRILLING CO.: GEOTECH  
DRILLING METHOD: GEO-PROBE  
SAMPLING METHOD: MACRO  
PROJECT NAME:  
LOCATION: FRONT AVE.  
PROJECT NO.: B15-300.1A

  
IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-15-99	APPROVED BY		DISK NUMBER	

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-HP-5	
										COORDINATES N _____ E _____	
0										FIELD GEOLOGIST _____ N.W.H.	DATE BEGAN 10-14-98
										CHECKED BY _____ N.W.H.	DATE FINISHED 10-14-98
										APPROVED BY _____	GROUND SURFACE EL _____
										TOTAL DEPTH 16.0'	
										DESCRIPTION	
0								gm		Crushed ROCK roadbed	
2.0'										Brown SILTY SAND; medium; grain size with 20% silt.	
5		*			700	MOIST		sm		Grey SILTY SAND (stained) 20% silt; grading finer; strong product odor.	
5.75'								ml		Grey SILT; with 20% fine sand.	
6.5'								ml			
10		*			5.0	MOIST SAT				Brown SANDY SILT with 15% fine sand; non-plastic; no product odor.	
										Stiff; grey-brown SILT; 10% fine sand; no product odor.	
15		*			5.5	SAT				Stiff; grey SILT; with 10% fine sand with grey and orange mottle; low plasticity.	
20						SAT				Grey SANDY SILT; as above.	
25						SAT				No recovery.	
										Grey SANDY SILT; as above.	
										Tan SILT; 10% fine sand.	
										BOTTOM OF BORING = 28.0 FEET	
30											
35											

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: NEAR BNSF RAIL  
 PROJECT NO.: B15-300.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
DATE	10-05-99	APPROVED BY	

COP0020458



DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")		RECOVERY		SAMPLE INTERVAL		P.I.D. (ppm)		MOISTURE CONTENT		DRILLING REMARKS		USCS		PROFILE		BORING NO. TOS-HP-6	
																		COORDINATES N _____ E _____	
0																		FIELD GEOLOGIST _____ N.W.H. DATE BEGAN 10-14-98	
																		CHECKED BY _____ N.W.H. DATE FINISHED 10-14-98	
																		APPROVED BY _____ GROUND SURFACE EL _____	
																		TOTAL DEPTH 28.0' DESCRIPTION	
0.5'																		ASPHALT	
2.5'																		GRAVEL roadbed with sand and silt	
12.0'																		Brown SILTY SAND with 10% silt angular fill; sand; no product odor.	
12.0'																		SAND as above.	
12.0'																		Light grey CLAYEY SILT with 10% fine sand; black and orange mottle; moderate plasticity; no product odor.	
20'																		Loose; coarse brown SILT to very fine sand; 15% fine sand; non plastic	
25'																		Stiff grey SANDY SILT.	
30'																		Stiff; tan SILT; with 10% fine sand; low plasticity; no product odor	
35'																		BOTTOM OF BORING = 28.0 FEET	

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: BEHIND TOSCO WAREHOUSE  
 PROJECT NO.: B15-300.1A



ITT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
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COP0020459

BORING NO. TOS-HP-7									
COORDINATES N _____ E _____									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-14-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-14-98</u>									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>24.0'</u>									
DESCRIPTION									
0									ASPHALT
									0.5'
									Brown SILTY SAND; 20% sand, grading less sand; non-plastic; no product odor.
									1.0'
									2.0
5	*		7.5	MOIST					Brown SANDY SILT; with high organic content; roots and organic debris; grey and black mottle
									Brown SANDY SILT; as above; fewer organics
				MOIST					Grey SANDY SILT with mica; trace organics; 5% fine sands
10	*								Brown SANDY SILT; 5% fine sand; low plasticity
			15.5	WET					Grey SANDY SILT; 10% fine sand; no odor or sheen.
				SAT					Brown SANDY SILT; 01-15% fine sand
	*								Grading coarser
15									Stiff grey SANDY SILT; no product odor.
									Stiff gray SILT; 10% fine sand; low plasticity; no odor.
20									
25									BOTTOM OF BORING = 24.0 FEET
30									
35									

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TRUCK LOADING/DOANE AVE.  
 PROJECT NO.: B15-300.1A



ITT CORPORATION

DRAWN BY M.J.S. CHECKED BY \_\_\_\_\_ FILE NAME & \_\_\_\_\_

COP0020460

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.L.O. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-HS-1	
										COORDINATES	
										FIELD GEOLOGIST	N.W.H.
										DATE BEGAN	10-27-98
										CHECKED BY	N.W.H.
										DATE FINISHED	10-27-98
										APPROVED BY	
										GROUND SURFACE EL.	
										TOTAL DEPTH	16.0'
										DESCRIPTION	
0								gw	0.5'	Crushed ROCK with sand.	
5		*			3	MOIST				Brown SILTY SAND; 50% coarse; 10% medium; 10% fine sand; 20% silt; no product odor	
10		*			18	MOIST		sm		Some brown SAND; no product odor	
15		*			78	MOIST				SAND as above; less silt; moderate product odor.	
20										Grading darker	
25										Grey-black SAND	
30										Dark grey SAND; as above; faint product odor.	
35		*			84	WET				BOTTOM OF BORING = 16.0 FEET	

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: TRIPOD/HAMMER  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: NEAR TK 3411  
 PROJECT NO.: B15-300.1A



ITT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
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COP0020461

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-HS-2	
COORDINATES											
0										FIELD GEOLOGIST	N.W.H.
										DATE BEGAN	10-27-98
										CHECKED BY	N.W.H.
										DATE FINISHED	10-27-98
										APPROVED BY	
										GROUND SURFACE EL.	
										TOTAL DEPTH	16.0
										DESCRIPTION	
0.5'								gw		ROCK/SAND	
						MOIST				Brown SILTY SAND; 20% silt; gravel.	
										No product odor.	
5								sm		Brown SILTY SAND; as above; slight product odor.	
		*			<18	MOIST				Color Variable; brown to grey; moderate product odor.	
10										Moderate product odor.	
						MOIST				Grey SILTY SAND; as above; strong product odor (gasoline).	
15		*			128	WET				BOTTOM OF BORING = 16.0 FEET	
20											
25											
30											
35											

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: TRIPOD/HAMMER  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: NEAR TK 3411  
 PROJECT NO.: B15-300.1A



ITT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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COP0020462

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.L.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-HS-3	
										COORDINATES	
										FIELD GEOLOGIST	N.W.H.
										DATE BEGAN	10-27-98
										CHECKED BY	N.W.H.
										DATE FINISHED	10-27-98
										APPROVED BY	
										GROUND SURFACE EL.	
										TOTAL DEPTH	16.0
										DESCRIPTION	
0						Mst		sw		ROCK/SAND	0.5'
										Brown SAND, 40% coarse 40% medium; 10% fine; 10% silt, no product odor.	
5					28	Mst				Grades to grey silty SAND at 4 ft. Slight product odor. Brown silty SAND; 10% silt, 50% coarse 30% medium 10% fine.	
					31	Mst		sm		Moderate product odor.	
10										Sand; same as above	
		*			28	Mst					
15		*			65	Wl				Brown SAND; same as above.	
										TOTAL DEPTH = 16.0 FEET	
20											
25											
30											
35											

DRILLING CO.: CRISMAN  
 DRILLING METHOD: PROBE TRIPOD  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TANK 3411  
 PROJECT NO.: B15-300.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-14-99	APPROVED BY		FILE NUMBER	



IT CORPORATION

COP0020463

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-HS-4	
									COORDINATES $\begin{matrix} N \\ E \end{matrix}$	
0									FIELD GEOLOGIST <u>N.W.H.</u>	DATE BEGAN <u>11-05-98</u>
									CHECKED BY <u>N.W.H.</u>	DATE FINISHED <u>11-05-98</u>
									APPROVED BY _____	GROUND SURFACE EL. _____
									TOTAL DEPTH <u>20.0</u>	
									DESCRIPTION	
0					Mst		gw	0.0	ROCK	
					Mst				Brown silty SAND: 30% coarse, 20% medium, 40% fine, 10% silt.	
5					Mst				Thin silt layer, brown sandy SILT, 10% fine sand	
					Mst				Brown silty SAND, 30% coarse, 30% medium, 30% fine, 10% silt.	
					Mst				No product odor.	
					Mst				Slight product odor.	
10		*		92	Mst		sm		Slight product odor.	
					Mst				Brown SILTY SAND (some as above)	
					Mst				Moderate product odor.	
15		*		61	Wt				Brown SILTY SAND, same as above moderate product odor.	
					Wt				Strong product odor.	
		*		134	Wt				Grey silty SAND, some as above	
					Wt				Block SILTY SAND; 30% coarse; 30% medium, 20% fine.	
20					Wt		ml		SILT; grey; 50% organics (roots).	
					Wt				Grey sandy SILT: 10% coarse sand; trace fine gravel; slight product odor, low plasticity, organics	
									TOTAL DEPTH = 20.0 FEET	

DRILLING CO.: GEO-TECH  
 DRILLING METHOD: GEO PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TANK 3411  
 PROJECT NO.: B15-300.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-14-99	APPROVED BY			

COP0020464

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-LS-1	
										COORDINATES	
										FIELD GEOLOGIST	N.W.H.
										CHECKED BY	N.W.H.
										APPROVED BY	
										TOTAL DEPTH	20.0'
										DATE BEGAN 10-13-98	
										DATE FINISHED	
										GROUND SURFACE EL.	
										DESCRIPTION	
0								gw		Rock/Sand Rock bed/gravel and sand	
						Mst				Medium brown SAND, poorly sorted; silty SAND ~15% silt	2.0'
5								sm			
					2.0	Mst				Coarse silty SAND; 30% silt; no product odor.	
10											
								ml		Grey sandy SILT; moderate plasticity, moist; 5% fine sand; black and grey; slight mottle; moderate product odor.	11.0'
										BOTTOM OF BORING = 12.0 FEET	
15											
20											
25											
30											
35											

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TOSCO BEACH  
 PROJECT NO.: B15-300 1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-27-99	APPROVED BY		DISK NUMBER	

COP0020465

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")		RECOVERY		SAMPLE INTERVAL		P.L.D. (ppm)		MOISTURE CONTENT		DRILLING REMARKS		USCS		PROFILE		BORING NO. TOS-LS-2		COORDINATES	
0																		FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-14-98</u>		CHECKED BY <u>N.W.H.</u> DATE FINISHED	
																		APPROVED BY		GROUND SURFACE EL	
																		TOTAL DEPTH <u>16.0</u>			
																		DESCRIPTION			
																		Ballast Rock			
																		Rock/Roadbed/brick sand, clay, mixed		2.0	
5																		Brown poorly sorted, silty SAND, non plastic, no odor.			
																		Brown silty SAND, 70% coarse grains; 10% silt; 20% fine sand, no product odor.			
																		Product odor; very faint.		9.0	
10																		Sandy grey SILT; 10% fine sand 90% silt; no product odor (wet)			
																		Slight product odor; grey SILT; same as above			
15																		BOTTOM OF BORING = 20.0 FEET			
20																					
25																					
30																					
35																					

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TOSCO BEACH, UPPER  
 PROJECT NO.: B15-3001A

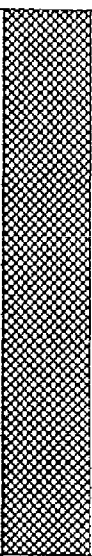





IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-27-99	APPROVED BY		DISK NUMBER	

COP0020466



DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-LS-3	
									COORDINATES	
0									FIELD GEOLOGIST <u>N.W.H.</u>	DATE BEGAN <u>10-29-98</u>
									CHECKED BY <u>N.W.H.</u>	DATE FINISHED _____
									APPROVED BY _____	GROUND SURFACE EL. _____
									TOTAL DEPTH <u>12'</u>	
									DESCRIPTION	
					Wl		sw		SAND	1.0'
				Mst	sm			SAND	2.0'	
5				Wl	ml			Brown SILT, 3% fine sand, black mottle non plastic no product odor.		
				Wl		Brown SILT; grey mottle; moderate plasticity; no product odor.				
10				Wl		Brown SILT; some as above, 5% fine sand				
									BOTTOM OF BORING = 12 FEET	
15										
20										
25										
30										
35										


DRILLING CO.: CRISMAN  
 DRILLING METHOD: PUSH PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: NEAR P1  
 PROJECT NO: B15-300.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-28-99	APPROVED BY		DISK NUMBER	



ITT CORPORATION

COP0020467

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-LS-4	
COORDINATES											
0										FIELD GEOLOGIST <u>N.W.H.</u>	DATE BEGAN <u>10-29-98</u>
										CHECKED BY <u>N.W.H.</u>	DATE FINISHED
										APPROVED BY	GROUND SURFACE EL
										TOTAL DEPTH <u>12'</u>	
DESCRIPTION											
0										Silty SAND, brown; 10% silt, 40% coarse; 20% medium; 30% fine	
5										SAND; some as above.	
										No product odor; moist.	
10										SAND; some as above.	
										SAND and SILT; 5% fine sand, sandy silt, mica flakes 1%; no organics; dense; moderate plasticity; no product odor.	
15											
BOTTOM OF BORING = 16.0 FEET											
20											
25											
30											
35											

DRILLING CO.: CRISMAN  
 DRILLING METHOD: PUSH PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TOSCO BEACH  
 PROJECT NO.: B15-300.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-29-99	APPROVED BY		DISK NUMBER	



ITT CORPORATION

COP0020468

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-29-99	APPROVED BY		DISK NUMBER	



IT CORPORATION

**COP0020469**

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (OPM)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-LS-6	
										COORDINATES	
0										FIELD GEOLOGIST	N.W.H. DATE BEGAN 10-29-98
										CHECKED BY	N.W.H. DATE FINISHED
										APPROVED BY	GROUND SURFACE EL
										TOTAL DEPTH	16'
										DESCRIPTION	
								gm		Rock Surface	1.0'
						Mst				SAND, brown, silty, 40% coarse, 80% medium, 30% fine	
5						Mst		sm		SAND, brown, same as above.	
					25	Wl				Slight product odor, some as above very faint	
10						Wl				Fine silty SAND, 60% fine sand, 40% silt slight product odor.	10.0'
					9	Wl				Fine grey SILT, sandy, moderate plasticity, 10% fine sand; slight product odor.	
								ml			
15					10					SILT, some as above with organic (root traces)	
										BOTTOM OF BORING = 16.0 FEET	
20											
25											
30											
35											

DRILLING CO.: CRISMAN  
 DRILLING METHOD: PUSH PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TOSCO BEACH  
 PROJECT NO: B15-300.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-29-99	APPROVED BY		DISK NUMBER	



ITT CORPORATION

COP0020470



BORING NO. TOSCO-RF-2									
COORDINATES <u>N</u>									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-13-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u></u>									
APPROVED BY <u></u> GROUND SURFACE EL. <u></u>									
TOTAL DEPTH <u>20.0</u>									
DESCRIPTION									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	
0							gw		Gravel ballast
2.0					Mst				SAND; low quartz; grayish brown; mixed color with brown. 15% silt; poorly sorted. non plastic no odor.
5							sm		
8.0	*		2.0						
10					Mst				Grey with some brown mottle SILT, grey no sand no odor
15							ml		Grey SILT; low plasticity.
16.0	*		3.0						
20									BOTTOM OF BORING = 20.0 FEET
25									
30									
35									

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TOSCO BEACH  
 PROJECT NO.: B15-300 1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
	7-27-98	APPROVED BY		REV	

COP0020472

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-UB-1	
									COORDINATES N _____ E _____	
									FIELD GEOLOGIST N.W.H. DATE BEGAN 3-31-99	
									CHECKED BY N.W.H. DATE FINISHED _____	
									APPROVED BY _____ GROUND SURFACE EL. _____	
									TOTAL DEPTH 32.0'	
									DESCRIPTION	
0									ASPHALT	
							gw		COBBLES; 2-3"	1.0'
					Mst				Brown SAND; 65% medium; 35% fine; < 5% silt; no product odor.	2.5'
5					Mst		sw		SAND; 90% sand; 10% gravel	
	*			0					SAND WITH SILT; 80% sand as above; 20% silt; no product odor.	
10										
	*			0	Wt Sat		ml		CLAYEY SILT; 5% fine sand; no product odor.	14.5'
15									Brown SAND (as above). SAND with 20% gravel fine to coarse.	15.5'
	*			0	Sat		sw		Brown SAND (as above)	
20									BOTTOM OF BORING = 20 FEET	
	*									
25										
30										
35										

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE.  
 PROJECT NO.: B15-300.1A




IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-15-99	APPROVED BY		DISK NUMBER	

COP0020473

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-UB-2	
										COORDINATES N _____ E _____	
										FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>3-31-99</u> CHECKED BY <u>N.W.H.</u> DATE FINISHED _____ APPROVED BY _____ GROUND SURFACE EL _____ TOTAL DEPTH <u>32.0</u>	
										DESCRIPTION	
0								gw	g	GRAVEL	
										1.0	
										Brown SAND; fine to medium; 60% medium; 80% fine; trace organics	
5		*			0			sw		Rootlets; no product odor.	
10										Rootlets	
15		*			0					Grading to grey sand, some.	
										16.5	
										Dark grey SAND; 0-10% silt; no product odor.	
20		*			10			sm		Reddish brown SAND; 15% silt	
										Grey SAND.	
										Dark grey to black SAND; faint product odor.	
25		*			140					BOTTOM OF BORING = 24.0 FEET	
30											
35											

DRILLING CO.: CASCADE  
DRILLING METHOD: GEO-PROBE  
SAMPLING METHOD: MACRO  
PROJECT NAME:  
LOCATION: WILLBRIDGE 54" SANITARY SEWER  
PROJECT NO.: B15-300.1A

  
IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-16-99	APPROVED BY		DISK NUMBER	



DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-UB-3			
										COORDINATES $\begin{matrix} N \\ E \end{matrix}$			
										FIELD GEOLOGIST	N.W.H.	DATE BEGAN	3-31-99
										CHECKED BY	N.W.H.	DATE FINISHED	
										APPROVED BY		GROUND SURFACE EL	
										TOTAL DEPTH	12.0		
										DESCRIPTION			
0						Dp				▽ ASPHALT	1.0'		
						Wl/Mst		gm		Rock and sand roadbed; large round rock with sand matrix.	2.0'		
						Mst				▽ Very fine SAND with 10-15% silt; brown.			
5	*	0.5				Mst				Very fine sand as above.			
	*	0				Wl		sp		Very fine sand; grading looser; brown; no product odor.			
						Wl				Brown sand; medium grained.			
10						Sot				▽ Dark grey; black sand with 5% silt; occasional pebbles; heavy sheen; diesel odor; (no pebbles) same as above; slight product odor. Depth to water 9.1' below ground surface after sampling.	11.0'		
	*	100				Sot		ml		Stiff; dark brown; grey silt, low plasticity; occasional rootlets.			
										BOTTOM OF BORING = 12.0 FEET			
										Water at 12.45 feet.			

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: WILLBRIDGE/SANSERVER  
 PROJECT NO.: B15-100.1A



IT CORPORATION

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COP0020475

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-UB-4	
										COORDINATES N E	
0										FIELD GEOLOGIST	N.W.H.
										DATE BEGAN	3-31-99
										CHECKED BY	N.W.H.
										DATE FINISHED	
										APPROVED BY	
										GROUND SURFACE EL.	
										TOTAL DEPTH	12.0'
										DESCRIPTION	
										ASPHALT	
											1.0'
										GRAVEL: graded river rock	
											2.0'
										SAND: clean, coarse grey with red and clear quartz grains; 20% quartz coarse.	
										Sand as above	
											7.0'
										Silt lense; 2" thick.	7.5'
											9.0'
										Brown silt with 5-10% fine sand.	
											10.0'
										Black SAND, strong product odor (diesel) many wood fragments and trace gravel.	
										BOTTOM OF BORING = 12.0 FEET	

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: WILLBRIDGE/SANSERVER  
 PROJECT NO.: B15-100.1A

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DATE	6-16-99	APPROVED BY		FILE NUMBER	



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DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/FT)	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-UB-5	
										COORDINATES N _____ E _____	
										FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>4-1-99</u>	
										CHECKED BY <u>N.W.H.</u> DATE FINISHED _____	
										APPROVED BY _____ GROUND SURFACE EL. _____	
										TOTAL DEPTH <u>12.0</u>	
										DESCRIPTION	
0								ml		ASPHALT	1.0
						Dry		qw		ROCK (roadbed)	2.0
								sm		Brown silty SAND; 20% silt; no product odor	
5	*			140		Mst				Grey green sandy SILT; very fine sand; faint product odor	4.5
						Msl					
	*			185		Wl		ml		SILT (as above)	
10						Wl					
	*			177		Wl				Rootlets, wood, organics, no sheen, moderate product odor	
BOTTOM OF BORING = 12.0 FEET											
15											
20											
25											
30											
35											

DRILLING CO.: CASCADE  
 DRILLING METHOD: HAND AUGER  
 SAMPLING METHOD: BRASS TUBE  
 PROJECT NAME:  
 LOCATION: 10" WOOD USP? ABANDONED  
 PROJECT NO.: B15-100.1A



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	6-16-99	APPROVED BY		DISK NUMBER	

COP0020477

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-UB-6	
										COORDINATES N _____ E _____	
										FIELD GEOLOGIST _____ N.W.H. DATE BEGAN _____ 3-31-99	
										CHECKED BY _____ N.W.H. DATE FINISHED _____	
										APPROVED BY _____ GROUND SURFACE EL _____	
										TOTAL DEPTH _____ 12.0' _____	
										DESCRIPTION	
0								ml		ASPHALT 12"	
						Dp		gw		Coarse clean dark grey SAND with rock (roadbed)	1.0
						Dp					
						Mst				Brown to grey SAND; 10% coarse; 60% medium; 25% fine; trace silt	2.5'
5		*			0	Mst		sw		SAND as above	
		*				Wt					
10		*			0	Wt		gw		SAND with fine to coarse gravel (fill) GRAVEL, fine, no product odor. Hard object at 11.8 feet.	10.0'
										BOTTOM OF BORING = 12 FEET	
15											
20											
25											
30											
35											

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: STORM IN N. BOARD FRONT  
 PROJECT NO.: B15-100.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-16-99	APPROVED BY		DISK NUMBER	



IT CORPORATION

COP0020478

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-UB-7	
										COORDINATES N _____ E _____	
0										FIELD GEOLOGIST <u>N.W.H.</u>	DATE BEGAN <u>4-1-99</u>
										CHECKED BY <u>N.W.H.</u>	DATE FINISHED _____
										APPROVED BY _____	GROUND SURFACE EL _____
										TOTAL DEPTH <u>20.0</u>	
										DESCRIPTION	
										ASPHALT	
										Gray	1.0
										Brown SAND with silt; 85% fine to medium sand with 15% silt no product odor.	
5		*			0			sm		Very fine brown SAND WITH SILT; 80% sand; 20% silt; no product odor.	
		*		1				ml		SILT WITH SAND; brown, low plasticity silt, with 15% fine sand; no product odor.	7.5
10								sm		Grading to SILTY SAND, SAND WITH SILT; brown.	9.5
								ml		Sandy SILT; 60% silt; 40% fine sand; brown, non-plastic; no product odor.	11.0
15		*			15			sm		Silty SAND; 5% silt.	13.0
										SAND; block; 15% silt; fine gravel; no product odor.	
										FILL	
20										Block SAND; 10% coarse; 35% medium; 55% fine; trace fine gravel; faint product odor or organics.	
										TOTAL DEPTH = 20.0 FEET	

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: 60" SANITARY GS LOT  
 PROJECT NO.: B15-100.1A



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DATE	6-18-99	APPROVED BY		DISK NUMBER	

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DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/8")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-UB-8	
										COORDINATES N _____ E _____	
										FIELD GEOLOGIST N.W.H. DATE BEGAN 4-1-99	
										CHECKED BY N.W.H. DATE FINISHED _____	
										APPROVED BY _____ GROUND SURFACE EL _____	
										TOTAL DEPTH 16.0' DESCRIPTION	
0										ASPHALT	0.5'
										Brown medium to fine SAND; no product odor.	
5						Mst					
						Mst					
	*				0	Mst					
10						Wt					
	*				0.5					Brown SAND; 80% fine sand; 15% very fine sand; 5% silt; no product odor.	
						Sol				Brown SAND; as above. no product odor.	
										Brown SAND; as above.	
15						Sol					
	*				0					Dark brown SAND as above; no product odor.	
BOTTOM OF BORING = 16.0 FEET											
20											
25											
30											
35											

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: 60" SANITARY  
 PROJECT NO.: B15-100.1A



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DATE	6-20-99	APPROVED BY		DISK NUMBER	

COP0020480

**APPENDIX C**

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**LABORATORY ANALYTICAL DATA REPORTS**

**(APPENDIX C IS A SEPARATE ATTACHMENT  
OF NINE VOLUMES)**

**APPENDIX D**

---

**BRISTOL REPORT**



**Tosco/Chevron**

**Summit Envirosolutions, Inc.**

**Bristol Environmental**

**Pacific Environmental Group**

**PROJECT GOALS**

**TECHNOLOGY**

**STUDY PERIOD**

**DATA PRESENTATION:**

**•Groundwater Hydrographs**

**•3-D GW Contour Maps**

**•Pumping Test Results**

# PROJECT GOALS & TECHNOLOGY

**Project Goals:** Continuous collection of groundwater data to assist in the characterization of the groundwater flow regime at the Wilbridge facility.

**Technology:** Remote data acquisition utilizing  
Campbell Scientific Dataloggers  
Pressure transducers  
PC208 - Remote communications software  
Access database



# **Remote Data Acquisition**

**Ability to monitor and manage aquifer resources remotely**

**Provide a cost-effective approach to the protection and assessment of groundwater resources**

**Develop a system that will reduce operating costs and improve decision making capabilities**

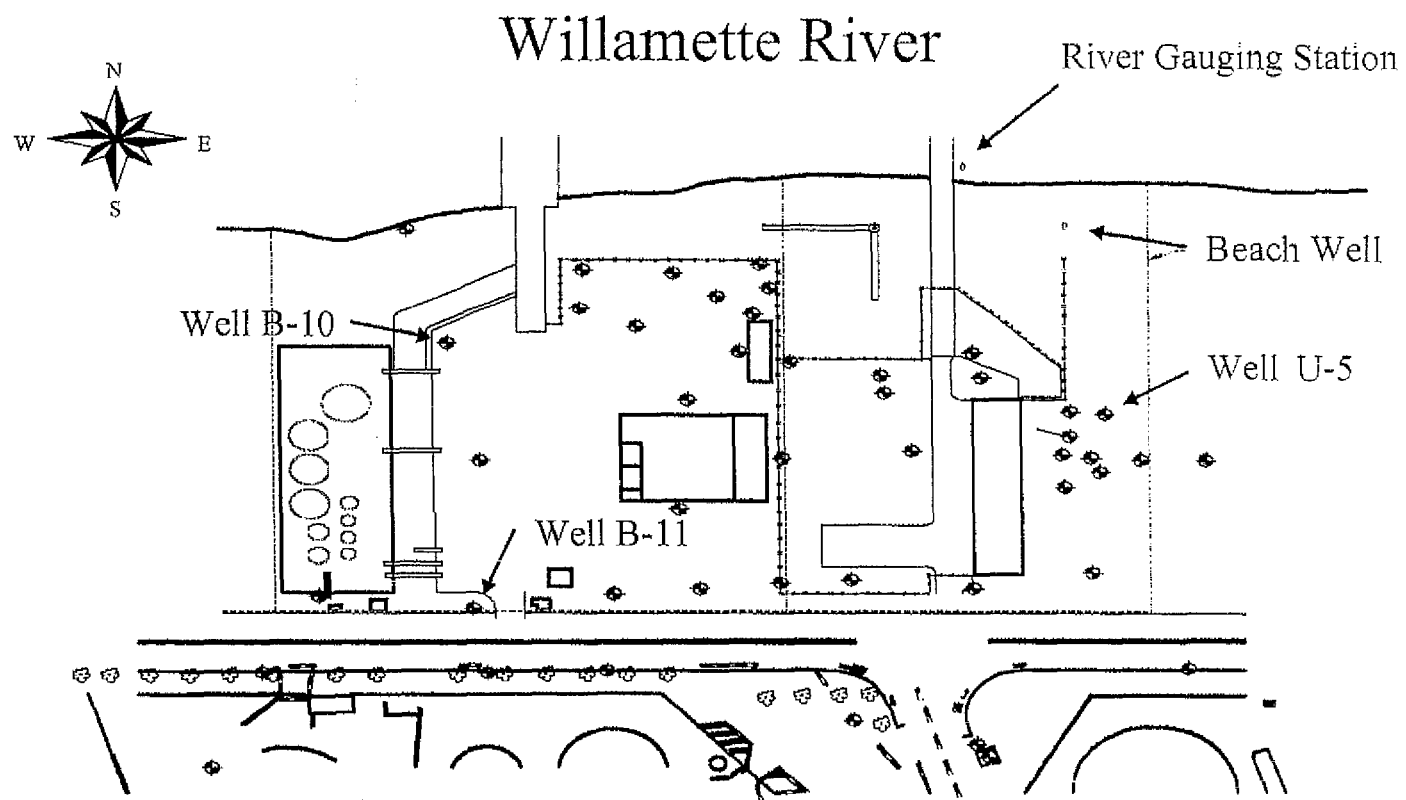
# **Operating Objectives of Remote Data Acquisition and Data Management**

- ⑥ **Development of a centralized database sufficient to support planning decisions relative to well head protection, water rights and projected long-term usage impacts**
- ⑥ **The ability to monitor multiple groundwater and surface water variables simultaneously to evaluate spatial and temporal trends and regional patterns**
- ⑥ **The ability to monitor the economic efficiency of pumping wells**
- ⑥ **Monitor and manage aquifer response to pumping, recharge and pumping well efficiency**

# **Operating Objectives of Remote Data Acquisition & Data Management**

- **GIS and Digital Imagery to characterize and monitor sites**
- **Pressure transducers and automated controls to acquire remote data**
- **Telecommunications package to enable efficient access to remote data**
- **Development of groundwater flow models using dynamic data sets**
- **GIS information as monitoring tool for site management**

# Tosco/Chevron Wilbridge Terminal



# **River Level Fluctuation Study Period**

**May 26, 1998 to June 16, 1998**

**High Water Level Mark**

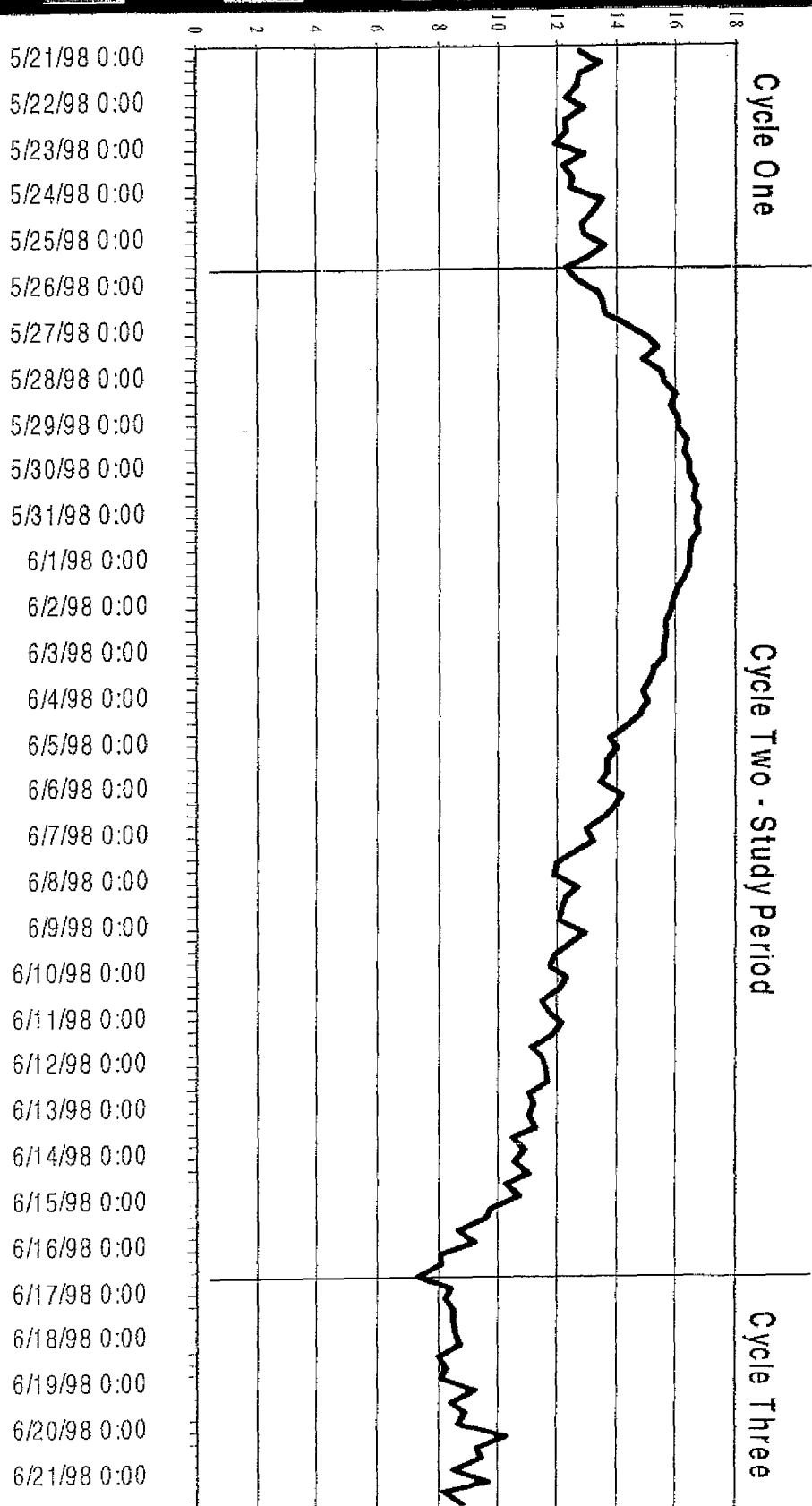
**- May 31, 1998 = 16.79 feet**

**Low Water Level Mark**

**- June 16, 1998 = 7.34 feet**

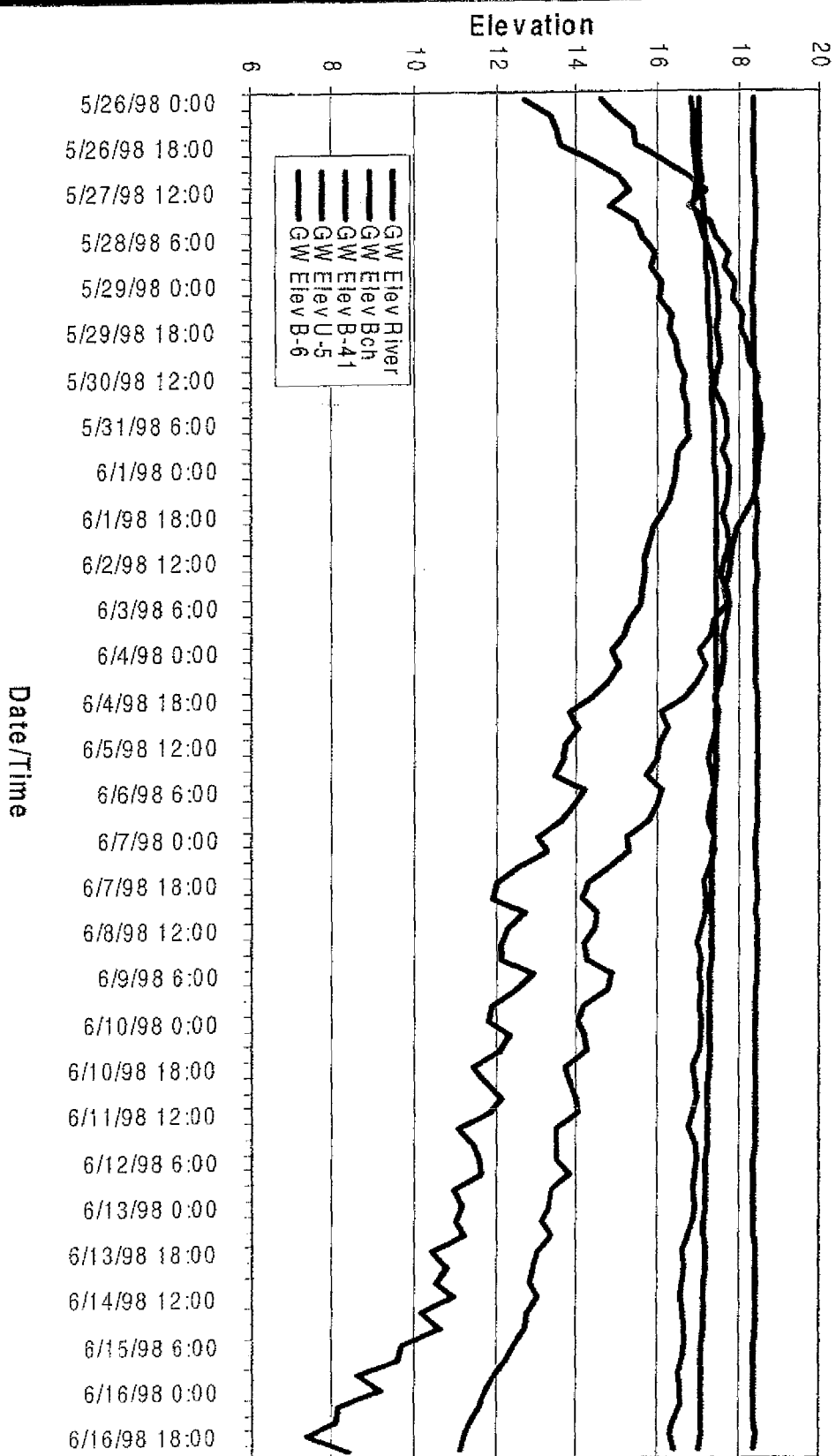
**Delta = 9.45 feet**

# Willamette River Level Fluctuations

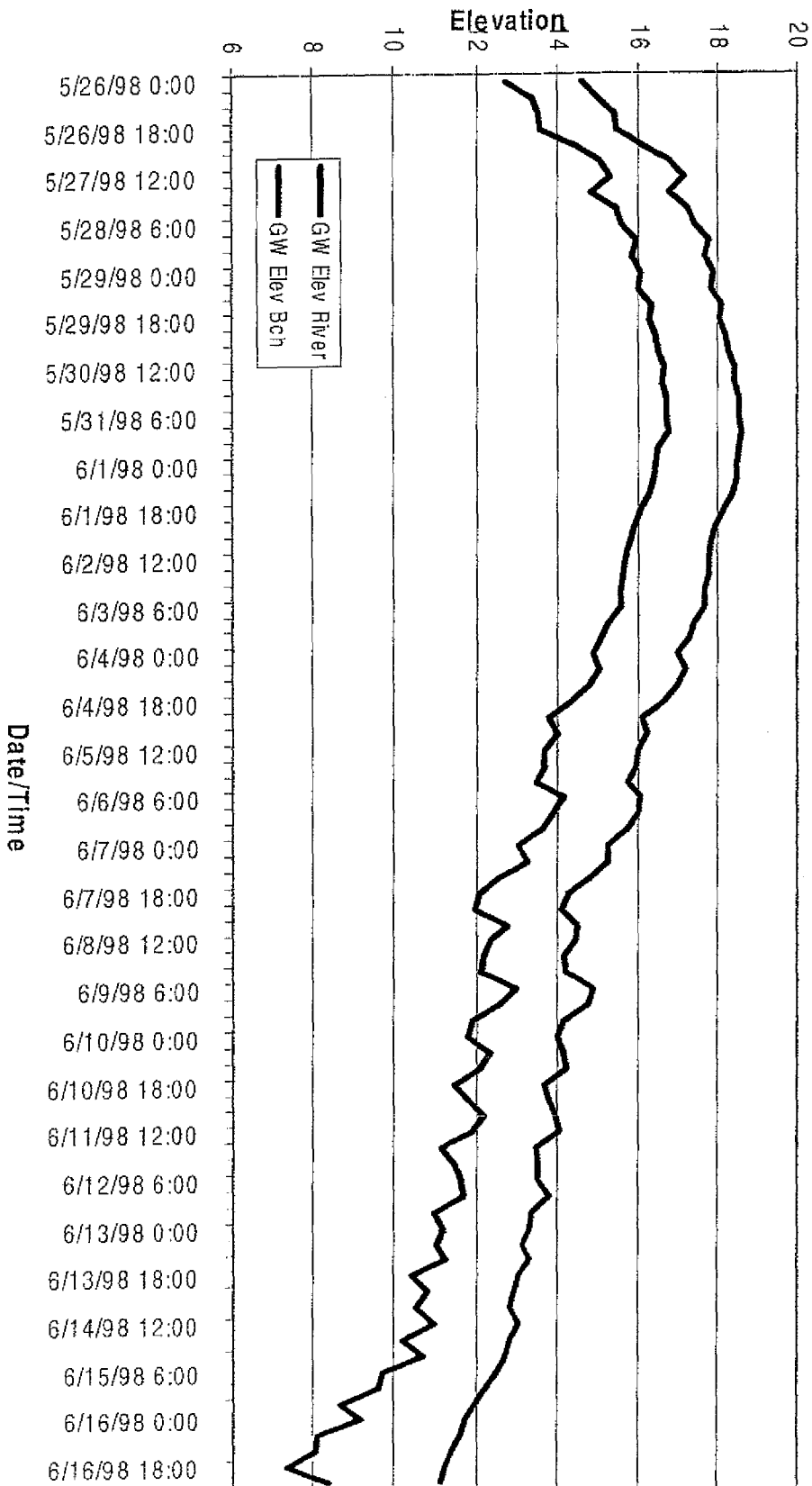




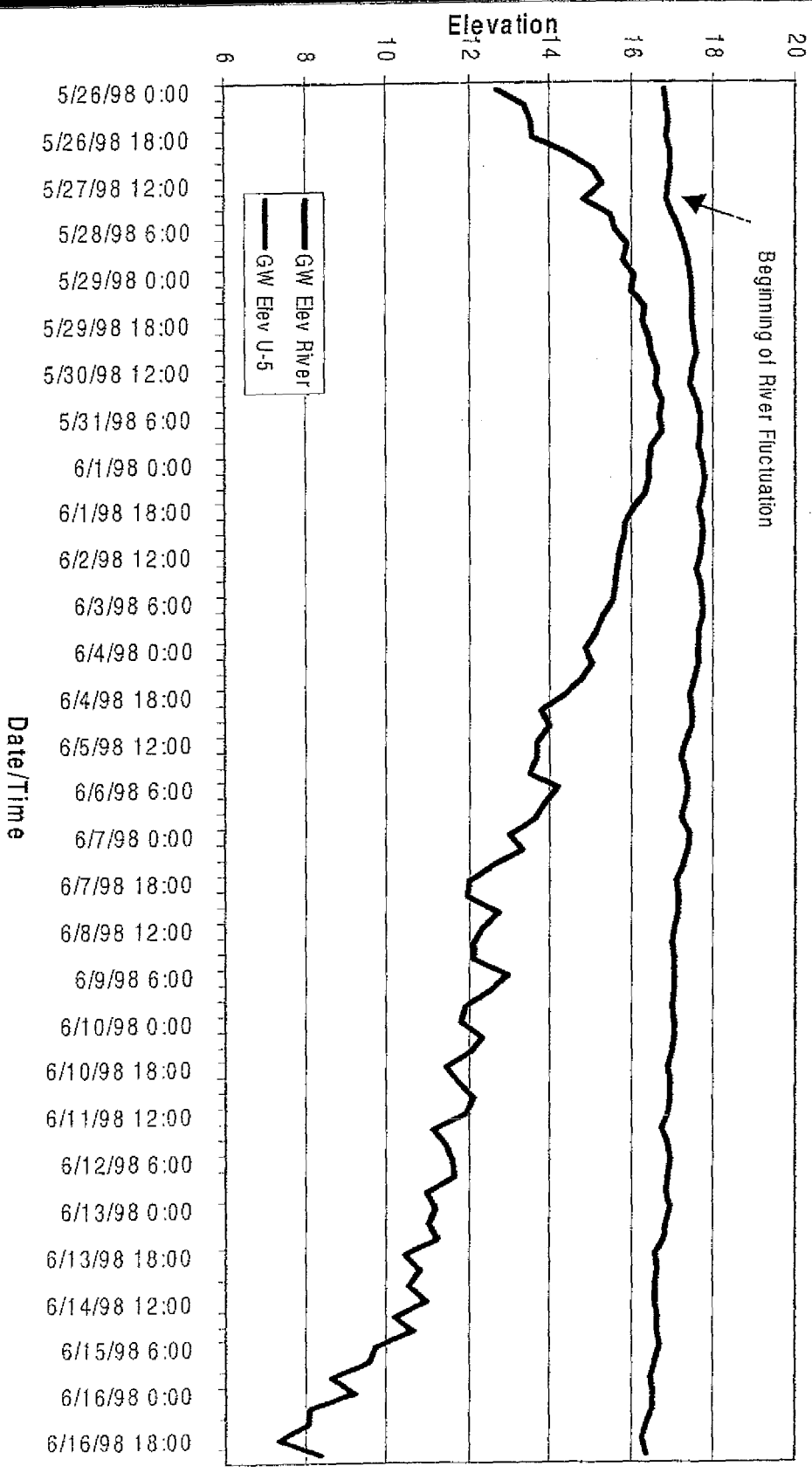
# Hydrograph: River, Beach, U-5, B-41, B-6



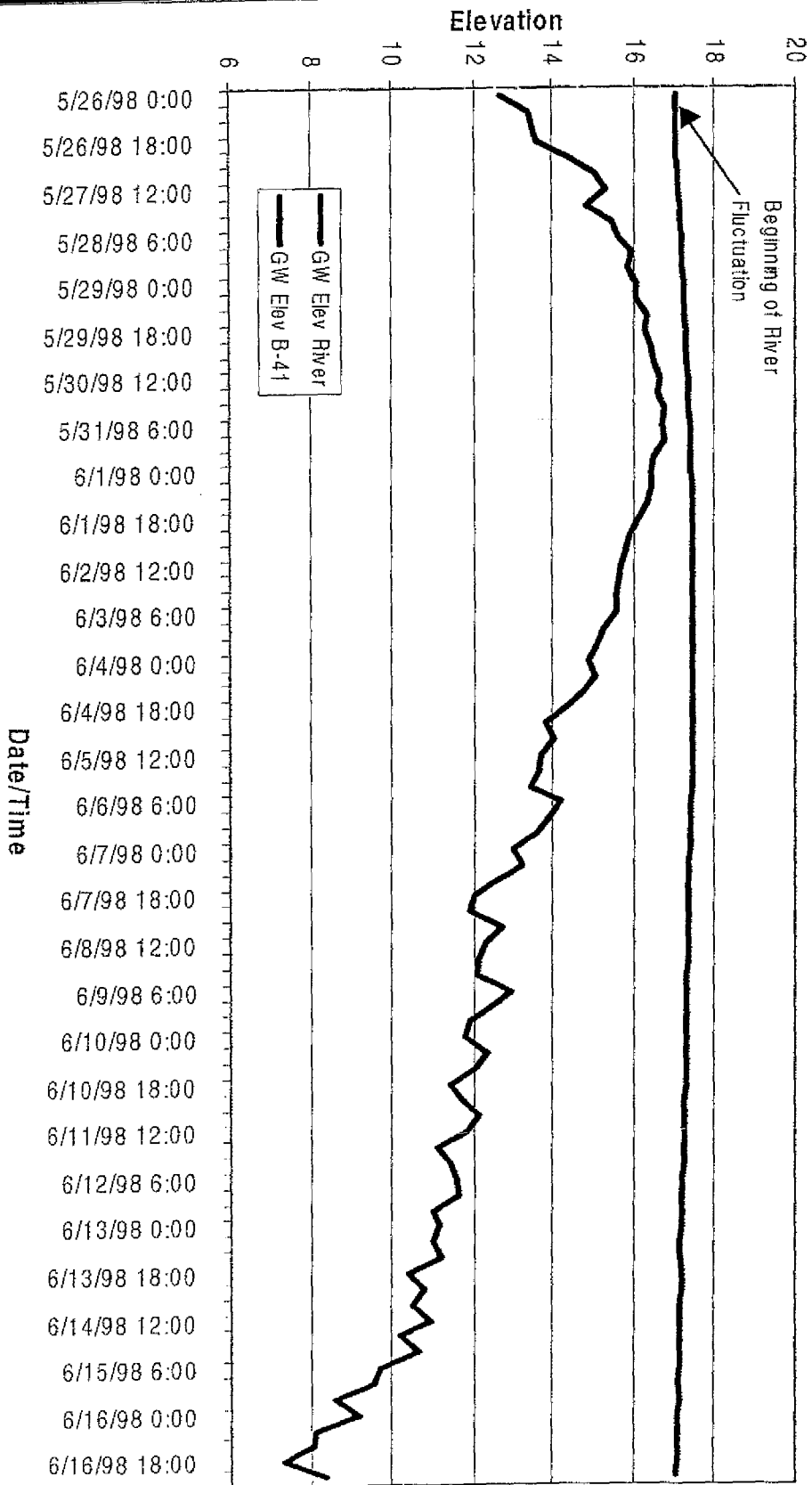
# **Hydraulic Connection Comparison Between River Gauging Station and Beach Well Located Approx. 50' Inland**



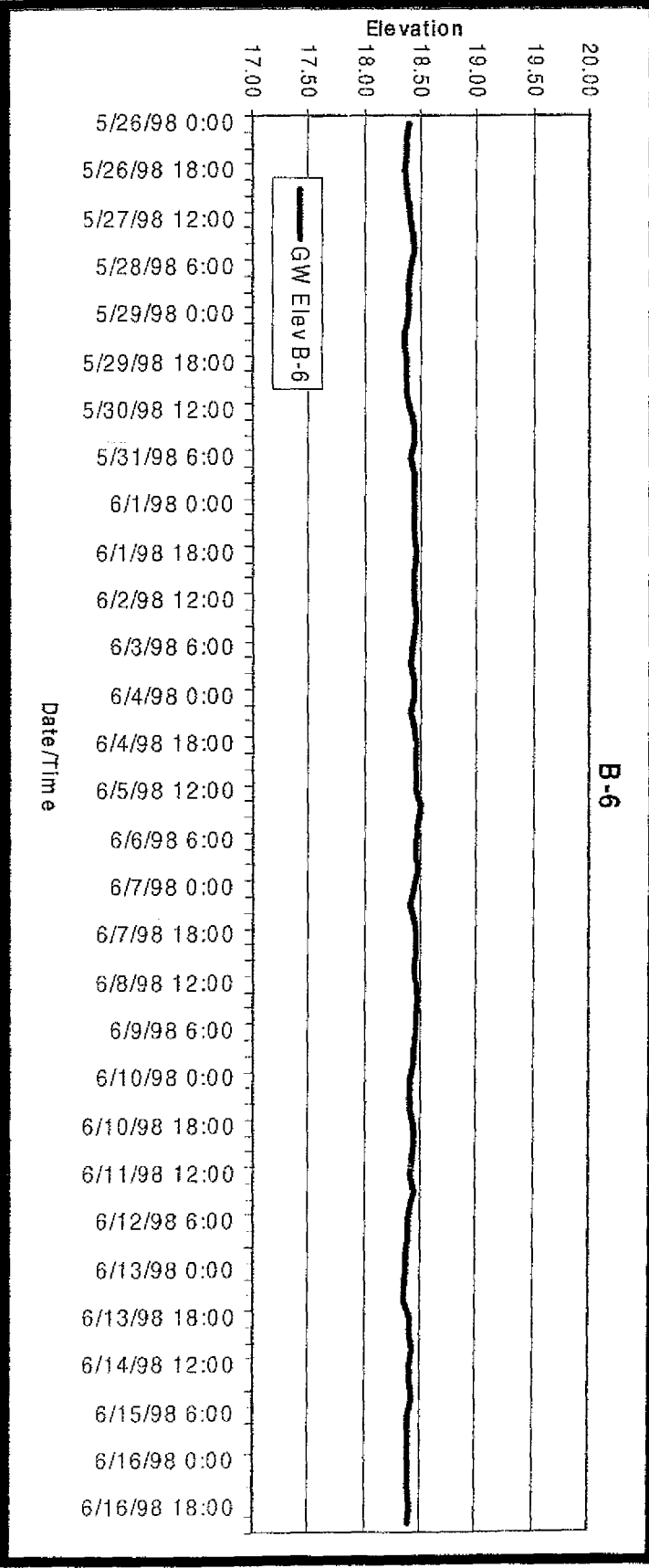
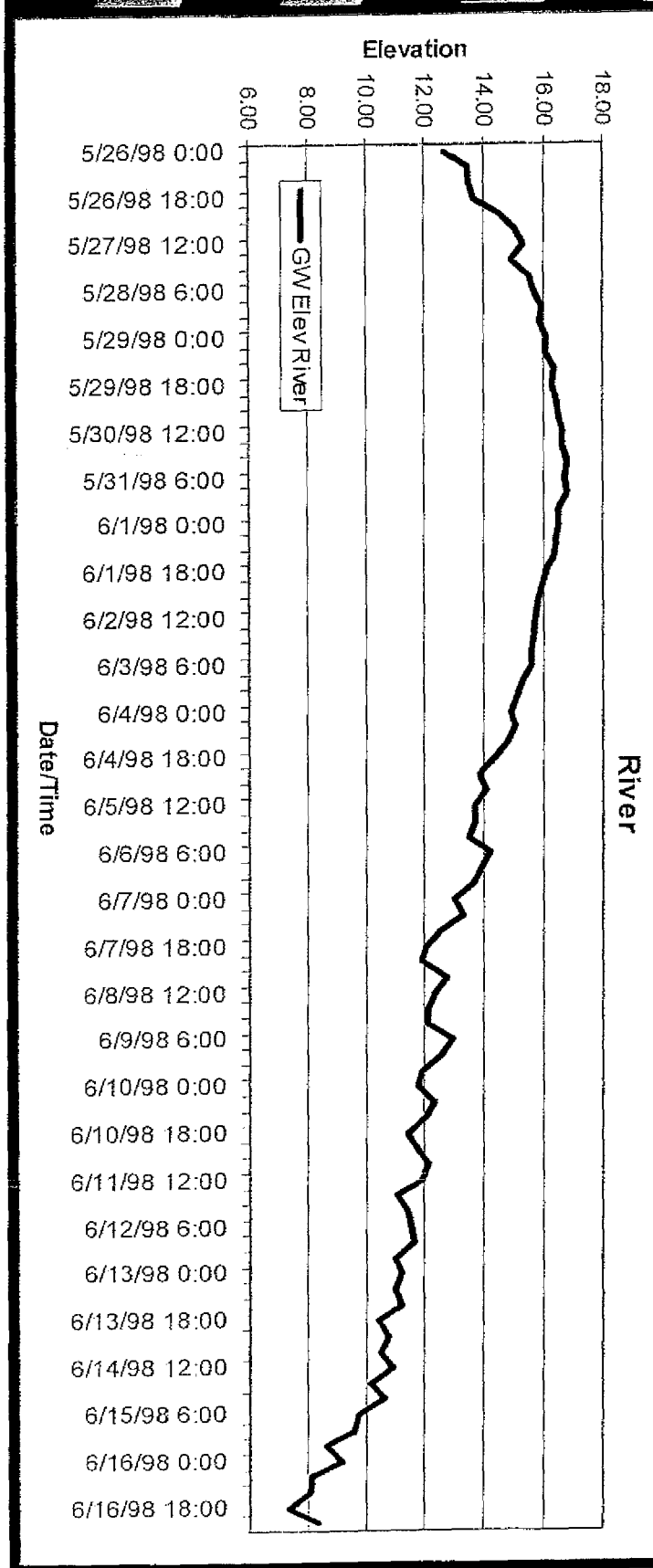
# Hydraulic Connection Comparison Between River Gauging Station and Well U-5 Located Approx. 230' Inland



# **Hydraulic Connection Comparison Between River Gauging Station and Well B-41 Located Approx. 330' Inland**

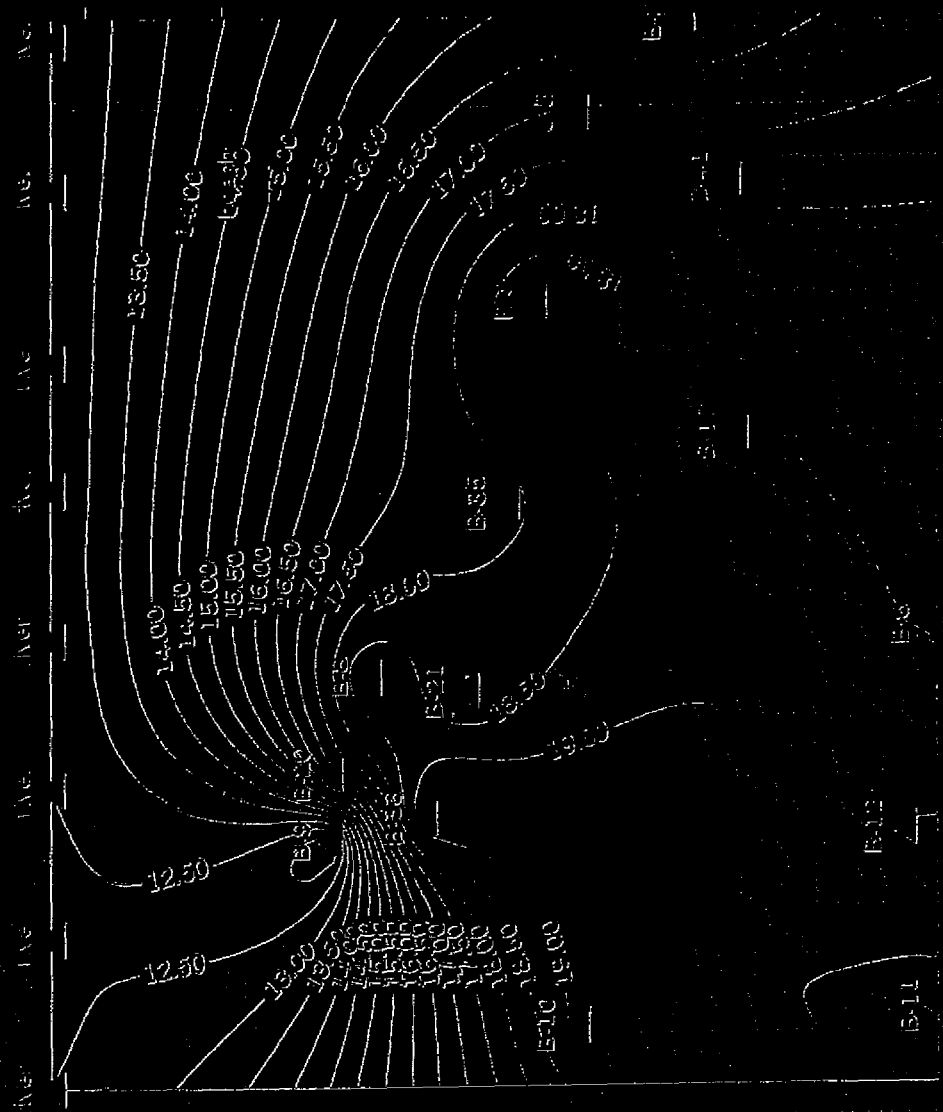


**Hydraulic Connection Comparison  
Between River Gauging Station and  
Well B-6 Located Approx. 440' Inland**



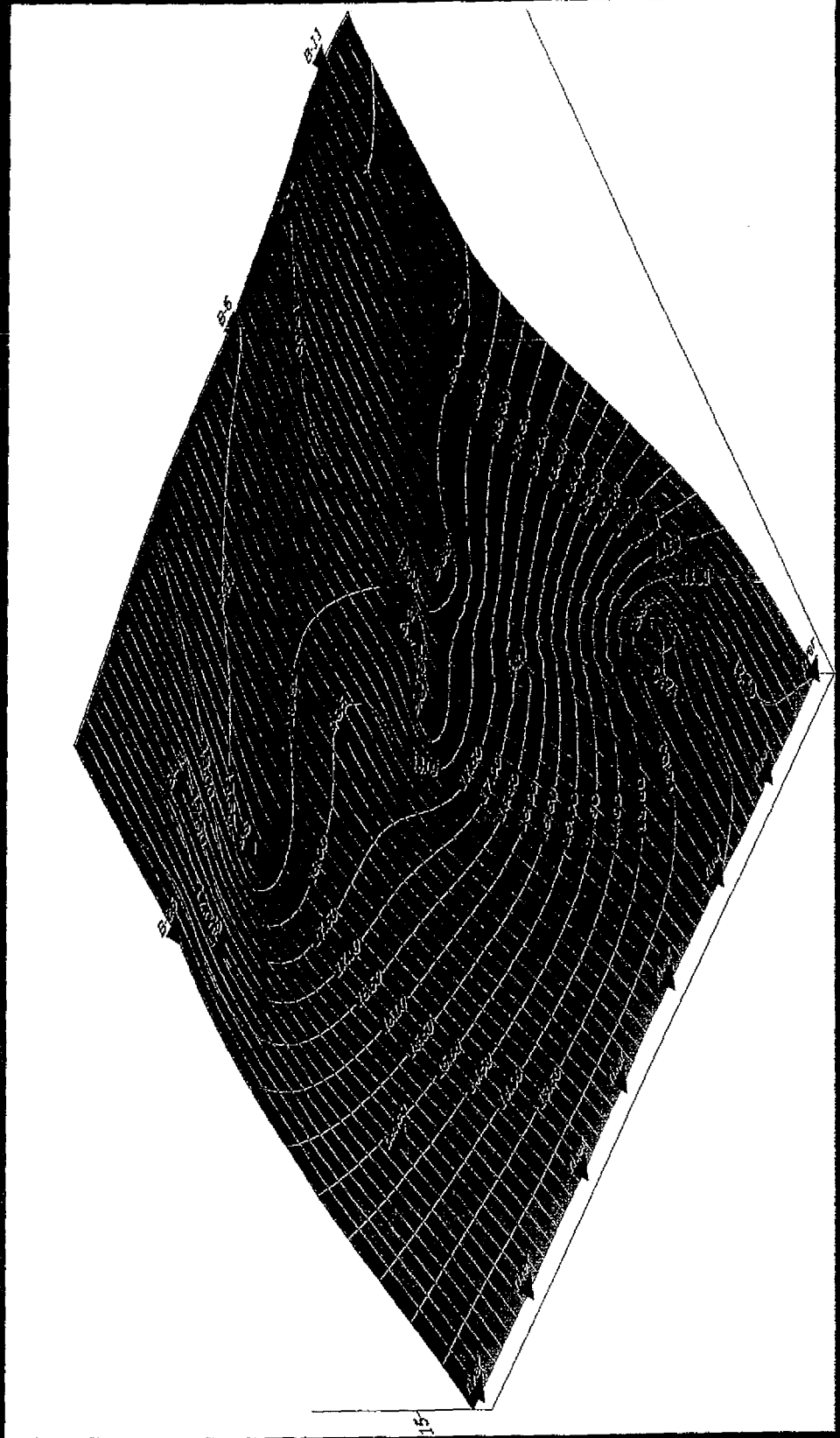
# Groundwater Elevations

## Pumping Test #1 June 9, 1998



# Groundwater Elevations

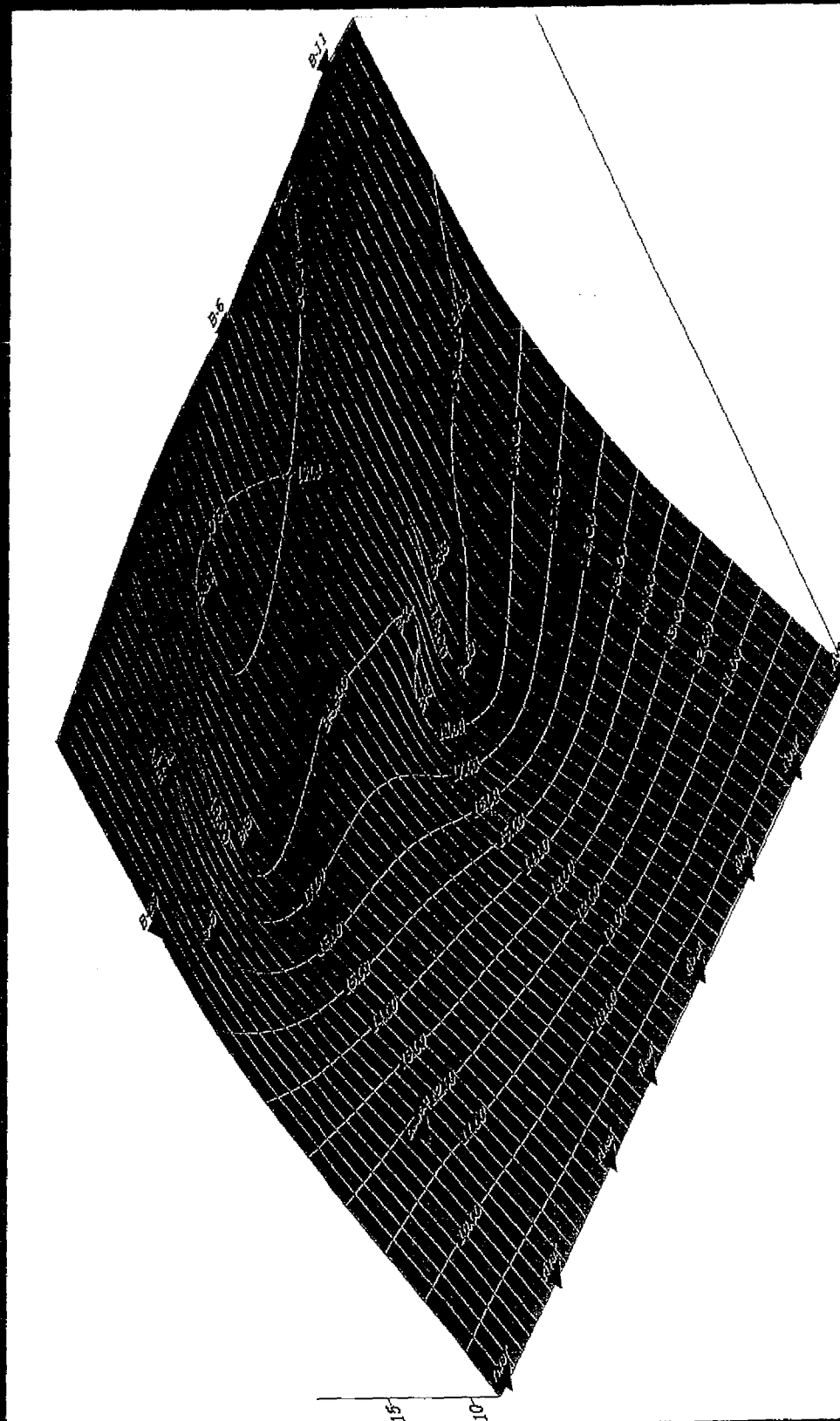
## Pumping Test #1 June 9, 1998





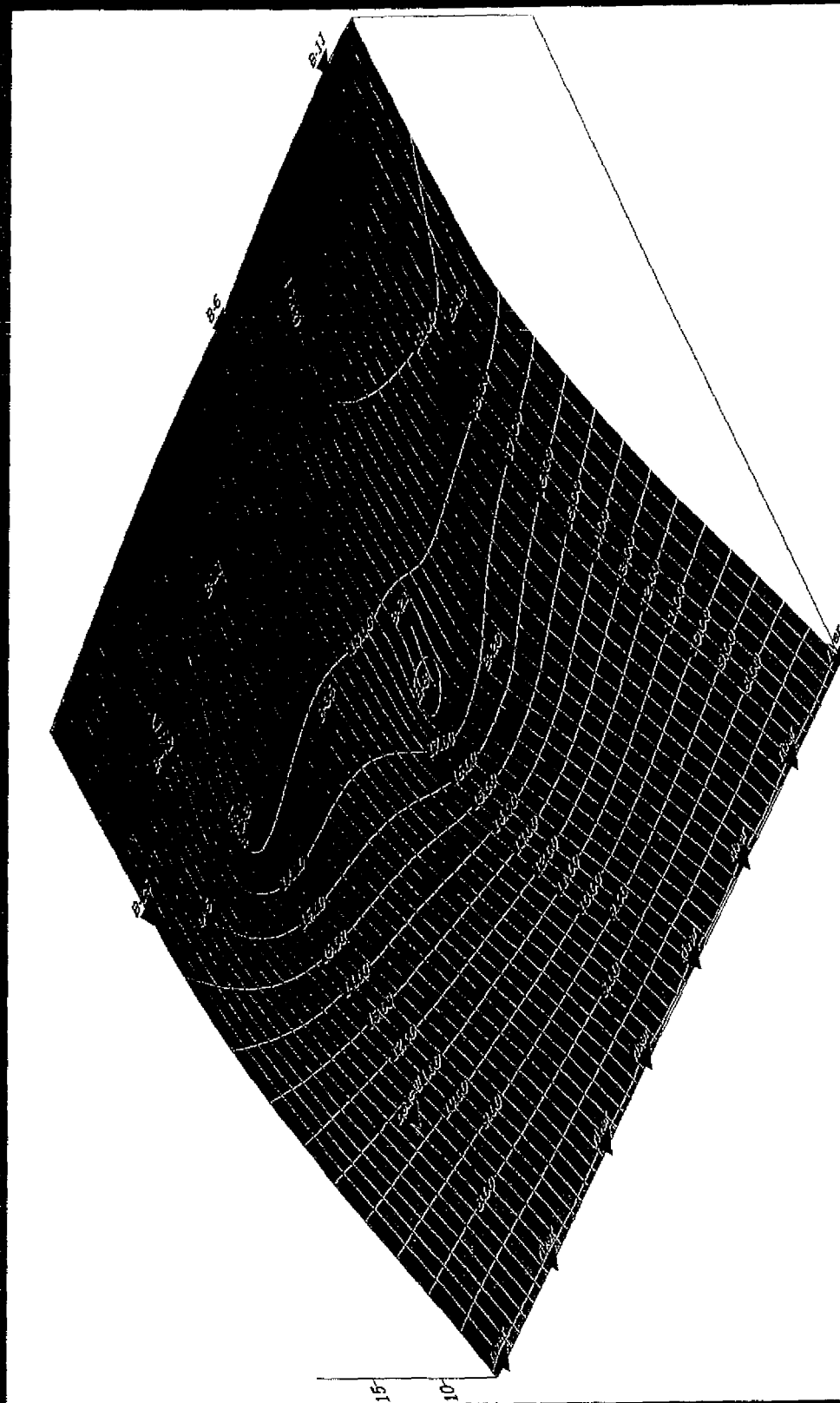
# Groundwater Elevations

## June 21, 1998



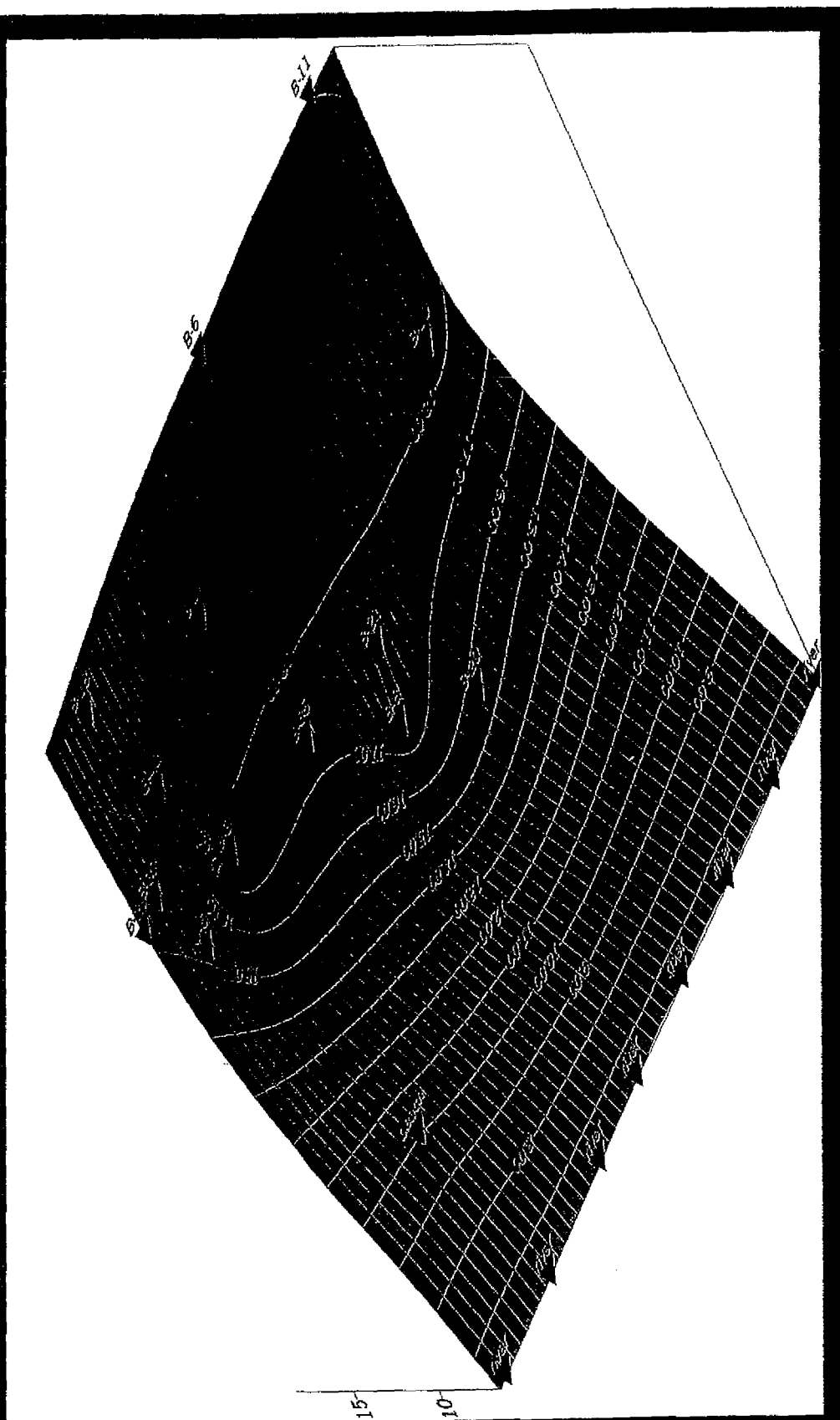
# Groundwater Elevations

## July 5, 1998

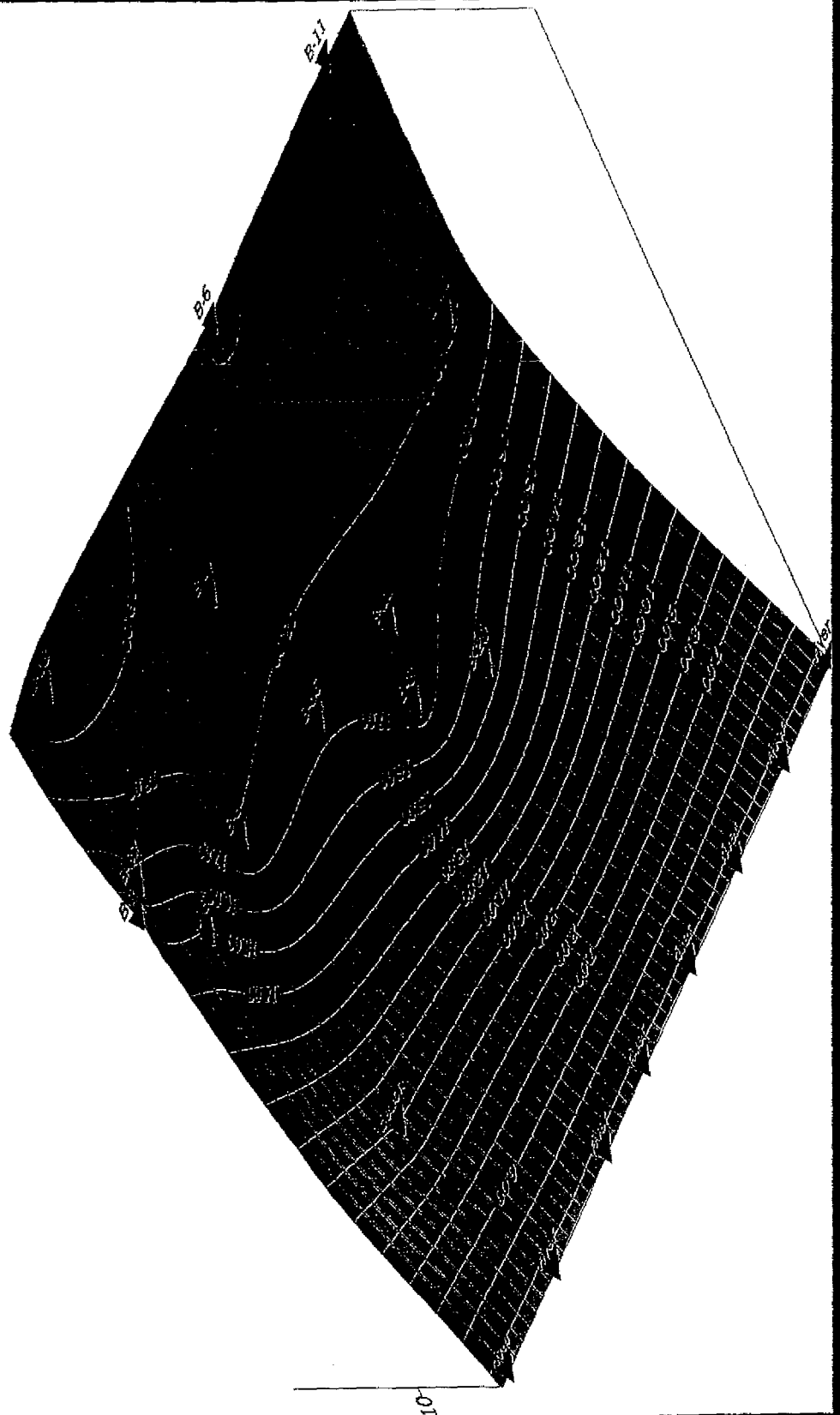


# Groundwater Elevations

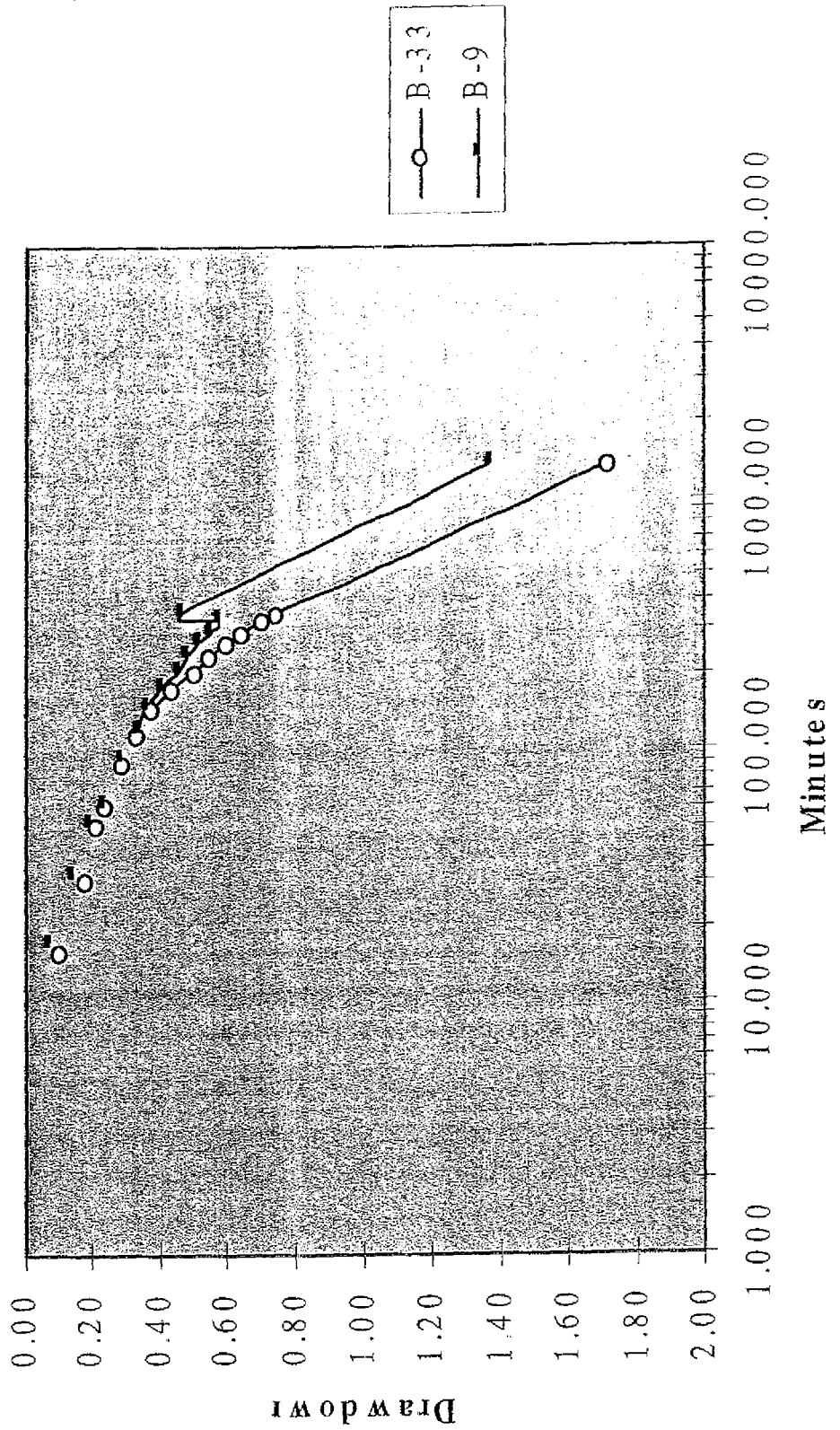
## August 11, 1998



# Groundwater Elevations September 1, 1998



# Pumping Test #2 - 15 GPM



# **Pumping Test Results**

## **Cooper Jacob Plot**

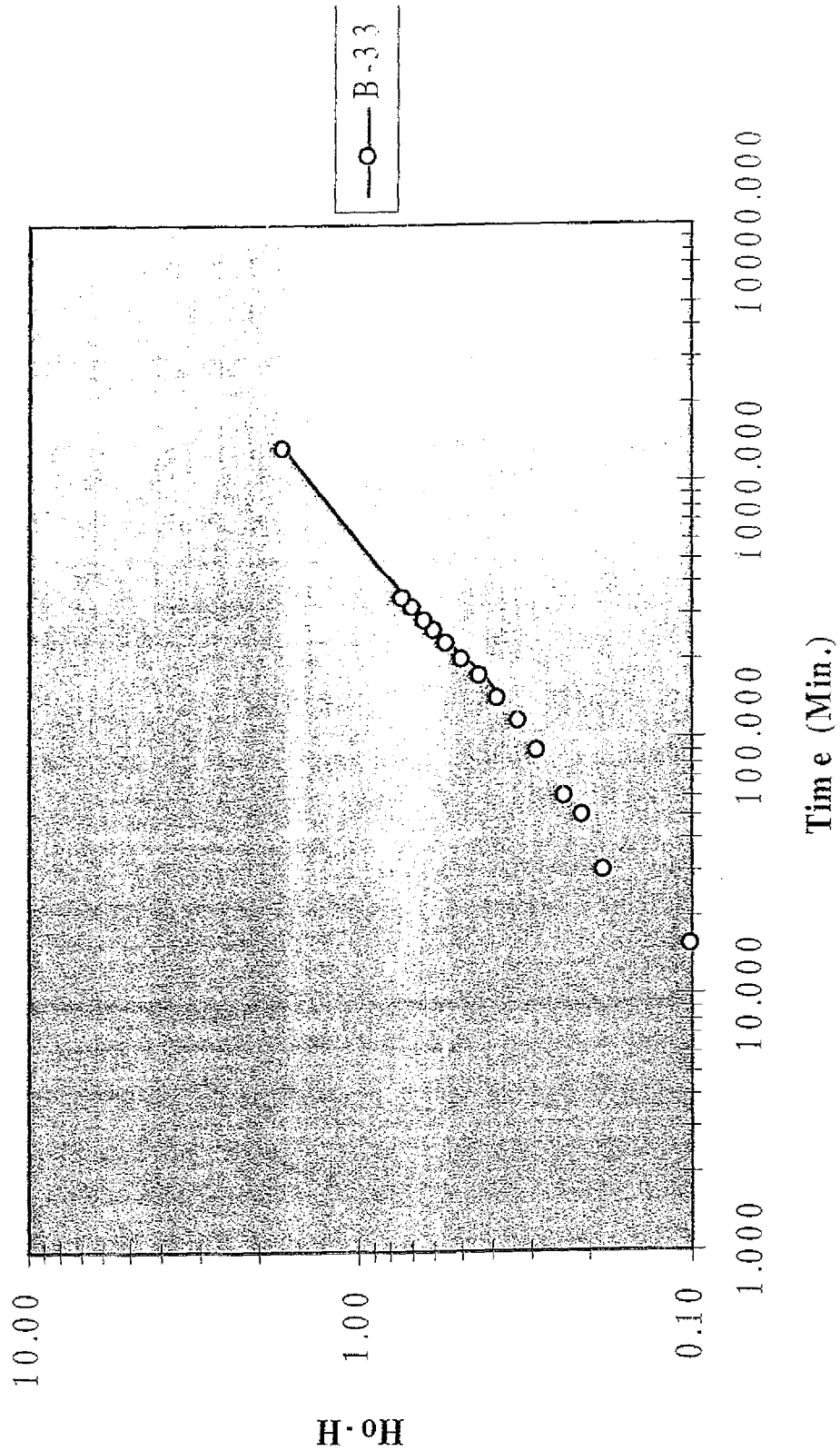
Cooper Jacob: Transmissivity and  
Storativity.

Transmissivity = hydraulic conductivity x  
thickness of aquifer (volume).

Storativity = measure of volume of water in  
a permeable unit available for discharge.

Reached Barrier Boundary (no recharge).

# Theis Curve



# Theis Curve

• Theis Curve: Hydraulic Conductivity

• Hydraulic conductivity = Amount of water which will travel through a 1-foot section of aquifer in a given time (volume vs. time).

• Reached Barrier Boundary (no recharge).





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**Human Health and Ecological Baseline Risk Assessments  
Willbridge Terminals Facility  
Portland, Oregon**

**Prepared for  
Willbridge Terminal Group**

**July 31, 2003  
15302**

Prepared by  
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## 1.0 INTRODUCTION

This report presents the Human Health and Ecological Baseline Risk Assessments for the Willbridge Terminals Facility (Willbridge Terminal) in Portland, Oregon (Figures 1 through 3). The Oregon Department of Environmental Quality (DEQ) and the Responsible Parties at the Willbridge Terminals signed a Consent Order that required the completion of a Remedial Investigation/Feasibility Study (RI/FS).

These risk assessments were completed to fulfill the requirements of Oregon Administrative Rule (OAR) 340-122-084. The main objectives of these risk assessments are to evaluate the potential for adverse impacts to human health and the environment attributable to exposure to site-related contaminants. These risk assessments were completed in accordance with relevant national and state guidance as discussed below.

This report includes text, tables, figures, and Attachments A through G. The entire report is included as an appendix to the RI Report. Unless explicitly identified otherwise, all references to tables, figures, or attachments are to documents contained within the report in this appendix.

## 2.0 HUMAN HEALTH RISK ASSESSMENT

This section describes the scope, focus, and approach for the human health risk assessment (HHRA) completed for the Willbridge Terminal site (Figures 1 through 3). This risk assessment conforms to the protocol for performing risk assessments under OAR 340-122-084, DEQ's Guidance for Conduct of Deterministic Human Health Risk Assessments (DEQ 2000), and the "Comment Response Document" prepared by KHM (August 15, 2002). Additionally, DEQ's revised Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites guidance (DEQ 2003) was also followed, particularly in regards to the modeling of volatile compounds from soil and groundwater to indoor and outdoor air and revised exposure factors for the industrial and trench worker scenarios. Other guidance was used as appropriate and where indicated. The HHRA evaluated the probability and magnitude of adverse impacts on human health associated with actual or potential exposure to site-related compounds of potential concern (COPCs). This information will be used to determine if remedial actions are needed to mitigate any predicted unacceptable risks.

The HHRA quantitatively evaluated the complete exposure pathways identified in the exposure pathway conceptual site model (CSM) developed for the site (Figures 7 and 8). In accordance with EPA and DEQ guidance, this risk assessment consists of the following phases: Data Summary and Evaluation, Exposure Assessment, Toxicity Assessment, Risk Characterization, and Uncertainty Analysis.

- **Data Summary and Evaluation:** In the data summary evaluation, the quality of the data sets is evaluated to ensure that the analytical results are of sufficient quality for use in a risk assessment.
- **Exposure Assessment.** In the exposure assessment, current and future land use scenarios were developed based on the conceptual site models for this site. Exposure point concentrations (EPC) and reasonable maximum exposure (RME) and central tendency (CT) intake rates were calculated for each complete exposure pathway based on the use of exposure factors that reflect site-specific conditions.
- **Toxicity Assessment.** In the toxicity assessment, quantitative toxicity information was collected, and appropriate toxicity values were determined for use in quantifying carcinogenic and non-carcinogenic risks associated with exposure to site-related chemicals. In the risk characterization phase, the results of the exposure assessment and toxicity assessment were combined to estimate the potential cancer risks and non-cancer hazard quotients at the site.
- **Uncertainty Analysis.** In the uncertainty section, the uncertainty associated with the exposure assessment, toxicity assessment, and risk characterization was discussed.

## **2.1 Site Background**

A brief summary of the site, including site location, previous investigations, and environmental setting, is provided in Sections 2.0 and 3.0 of the RI Report. Current and potential future uses of land and water on site and in the site vicinity are also presented in the beneficial land and water use survey presented in Sections 2.0 and 7.0 of the RI report.

Because the Willbridge Terminal site is divided into three separate properties (ChevronTexaco, KMLT, and ConocoPhillips), the HHRA estimated risks and hazards to potential receptors at each property separately. For purposes of this HHRA, these properties are identified as the ChevronTexaco OU (Figure 4), KMLT OU (Figure 5), and the ConocoPhillips OU (Figure 6). The Chevron OU is further divided into two subareas: the ChevronTexaco Ethanol Area and the Non-ChevronTexaco Ethanol Area. The ChevronTexaco Ethanol Area is

currently undergoing active subsurface soil remediation (personal communication with Mr. Gerard Koschal, May 27, 2003) via soil-vapor extraction and extensive groundwater sampling has been conducted in this area since 1999. The soil-vapor extraction system has been in continuous operation since December 2002. The ChevronTexaco Ethanol Area is in the southwestern portion of the Chevron property and, for the purposes of this HHRA, was identified as the area around monitoring wells CR-8, CR-10, CR-18, CR-24A, and GPW-1.

In addition to these three OUs, risks and hazards were also evaluated for the utility corridor located underneath Front Avenue. For the purposes of this HHRA, the utility corridor was evaluated from the north end of the KMLT property to just south of the ConocoPhillips property.

Five monitoring wells were installed on the ChevronTexaco Asphalt property immediately south of the ConocoPhillips property. Potential risks and hazards to workers at ChevronTexaco Asphalt were also evaluated using the associated groundwater data.

## **2.2 Data Summary and Evaluation**

As described in Section 6.1 of the RI report, a data validation was performed for data collected during RI fieldwork activities. In addition, validation was performed on a limited amount of groundwater monitoring data collected before the RI.

Attachment A includes data quality evaluation tables for all soil and groundwater samples used in this HHRA (Tables A-1 through A-9). As shown in the soil data quality tables, the sample quantitation limits (SQLs) met data quality objectives for the HHRA; in this case the SQLs were generally less than EPA Region 9 Industrial Soil Preliminary Remediation Goals (PRGs). The few samples with soil SQLs greater than the industrial soil PRGs are not likely to affect the overall conclusions of the HHRA. The groundwater data tables indicate that the groundwater SQLs exceeded the EPA Region 9 Tap Water PRG in the pesticide analyses (KMLT OU only), carcinogenic PAH analyses, and a portion of the volatile organic compound (VOC) analyses. However, the groundwater SQLs generally met the data quality objectives of the HHRA, which are the volatilization from groundwater to indoor air for the site worker and inhalation of volatiles and dermal contact with groundwater for trench and utility workers. Therefore, even though the groundwater SQLs exceed the EPA Region 9 Tap Water PRGs, they are generally acceptable for the purposes of this HHRA.

Reporting limits for some samples were elevated because of dilutions or matrix interference. Consequently, some reporting limits for chemicals that were not detected exceed risk-based screening concentrations. However, most of the reporting limits met project data quality objectives, and most chemicals with elevated reporting limits were selected as chemicals of potential human health concern and therefore, carried through the quantitative risk assessment based on other detected results. Therefore, the effects of the few elevated reported limits should be minimal.

Overall, as described in the RI Report, data generally were considered acceptable for use in the baseline HHRA.

## **2.3 Exposure Assessment**

The exposure assessment identifies the human populations, at the site and in the site vicinity, which could come into contact with the COPCs. The routes, duration, frequency, and magnitude of potential exposures are estimated in this section. The objectives of the exposure assessment are:

- Identify compounds of potential concern;
- Characterize the exposure setting;
- Identify potentially exposed populations;
- Identify potentially complete exposure pathways; and
- Measure or estimate the magnitude, duration, and frequency of exposure for each receptor (or receptor group).

### **2.3.1 Identifying the Compounds of Potential Concern**

As discussed in Section 2.2, COPCs were selected from data collected during the 1998 RI for soil and from groundwater data collected since 1997.

Groundwater data in the ChevronTexaco Ethanol subarea of the ChevronTexaco OU was limited to data from samples collected in 2001 and 2002 due to very high detections during the 1999 and 2000 sampling events. The 2001 and 2002 groundwater data are considered more representative of current conditions as the earlier data were collected prior to the initiation of active soil remediation at this location.

Chemical analyses on soil and groundwater samples collected from the site have identified total petroleum hydrocarbons (TPH), VOCs, semivolatile organic compounds (SVOCs), metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and zinc), and pesticides as the compounds of interest



(COIs) for the site. COIs are defined as compounds detected at the site, while COPCs are those compounds that exceed the risk-based screening levels as discussed below and are carried forward in the HHRA.

Soil and groundwater COPCs were identified for each OU (KMLT, ChevronTexaco, and ConocoPhillips) and the utility corridor and separate risk calculations and risk estimates were conducted for each area. This was done under the assumption that a worker would spend his/her entire career at one OU being employed by one of the operators of the bulk terminal facility.

**Evaluation for COPCs.** In accordance with DEQ HHRA guidance (DEQ 2000), soil COIs were conservatively screened against EPA Region 9 Industrial Soil PRGs, and groundwater COIs were conservatively screened against EPA Region 9 Tap Water PRGs (EPA 2002a). Industrial PRGs were used since current and future land use at the site is industrial. The use of industrial PRGs for identifying COPCs for industrial sites is consistent with Section 2.3.2(3)(a) of the DEQ HHRA guidance.

Section 2.3.2(1) of the DEQ guidance states that COI detected in less than five percent of the samples site-wide for a given media should not be selected as COPCs assuming that the practical quantitation limits (PQLs) and method reporting limits (MRLs) are adequate (see Section 2.2 for a discussion of PQLs and MRLs). Section 2.3.2(2) of the DEQ guidance states that inorganic COI detected at concentrations less than a selected background value should not be selected as a COPC. State of Washington natural background levels were used in lieu of site-specific background levels (Ecology, 1994). The use of State of Washington background values was recommended by DEQ in their comments on the draft RI Report and is consistent with recent DEQ Guidance.

Additional steps, which are described in Section 2.3.2, (3)(a) through (e) of the DEQ guidance, were also performed to evaluate potential cumulative effects from multiple compounds or from an individual compound detected in multiple media.

Tables 1 through 3 summarize the identification of COPCs in soil and groundwater for KMLT, ChevronTexaco, and ConocoPhillips OUs, while Table 4 identifies the COPCs for the Utility Corridor. Only COIs detected in soil and groundwater in more than five percent of OU-wide samples are presented in Tables 1 through 4 for COPC evaluation. The samples used in this risk assessment are identified in Attachment A of this risk assessment report.

Based on this COPC selection process, the following COPCs were identified in each OU:

#### **1.3.1.2 KMLT OU**

- **Soil:** Aviation gasoline range TPH, SVOCs (benzo(a)anthracene and benzo(a)pyrene), and arsenic. No soil PRGs were available for TPH; however, since the noted TPH fraction was detected in soil it was retained as a COPC.
- **Groundwater:** VOCs (1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, chloroform, ethylbenzene, toluene, and total xylenes), SVOCs (bis[2-ethylhexyl]phthalate, chrysene, naphthalene, and 2-methylnaphthalene), arsenic, and lead.

#### **1.3.1.3 ChevronTexaco OU**

- **Soil:** SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene).
- **Groundwater:** Gasoline and diesel range TPH, VOCs (1,2,4-trimethylbenzene, benzene, methyl-tertbutyl-ether [MTBE], toluene, and total xylenes), SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, and 2-methylnaphthalene), arsenic, cadmium, chromium, and lead. No groundwater PRGs were available for TPH; however, since the noted TPH fraction was detected in groundwater it was retained as a COPC.

#### **1.3.1.4 ConocoPhillips OU**

- **Soil:** Gasoline range TPH, benzene, and SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene). No soil PRGs were available for TPH; however, since the noted TPH fraction was detected in soil it was retained as a COPC.
- **Groundwater:** VOCs (1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, n-propylbenzene, and total xylenes), SVOCs (benzo(a)anthracene, benzo(b)fluoranthene, chrysene, and naphthalene), arsenic, barium, chromium, and lead.

#### **1.3.1.5 Utility Corridor**

- **Soil:** SVOCs (benzo(a)anthracene, benzo(a)pyrene, and dibenz(a,h)anthracene) and arsenic.
- **Groundwater:** VOCs (1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, n-propylbenzene, and total xylenes), SVOCs (benzo(a)anthracene,

benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, and 2-methylnaphthalene), arsenic, cadmium, chromium, and lead.

**KMLT and ChevronTexaco Landscape Worker Data Sets.** Landscape workers at the KMLT and ChevronTexaco OU were identified as potential human receptor populations by DEQ. To assess the potential risks to these workers at these OUs, a conservative risk-based screening was conducted to determine whether there were any COPCs that could be identified for this exposure scenario. The following surface soil samples were evaluated for this exposure scenario for these two OUs: KMLT (G-SS-13, G-SS-14, G-RF-2[1.5], G-RF-3[2], and G-RF-4[2.5]; Figure 5) and ChevronTexaco (C-SS-15, C-SS-14, C-RF-1[4], and C-RF-3[4]; Figure 4). Sample C-RF-3[4], collected from a depth of 4 feet (below the 0-to-3-foot interval) was included in the ChevronTexaco Landscape Worker data set because of the limited number of surface soil samples that were collected in the area where landscaping will take place. Tables 5 and 6 present summaries of the landscape worker soil data sets for the KMLT and ChevronTexaco OUs, respectively. As shown in Tables 5 and 6, the maximum detected concentration of COIs at each OU are all below the EPA Region 9 Industrial Soil PRG. Since the magnitude of exposure to a landscape worker is significantly less than that of a full-time industrial worker, landscape worker exposure to soil was concluded to be acceptable and not evaluated further in this HHRA. Groundwater COPCs for each OU were further evaluated for the landscape worker scenario.

**ChevronTexaco Asphalt Data Set.** Groundwater data from five monitoring wells (A-1, A-5, W-6, W-10, and W-16) on the ChevronTexaco Asphalt property were evaluated for the Chevron Asphalt site. As shown in Table 7, the only compounds detected in these five samples are acenaphthene and five metals. The only potentially complete exposure pathway for off-site workers is volatilization from groundwater to indoor or outdoor air. Acenaphthene is considered a volatile compound, however, it was detected at a concentration (2.04 µg/L) that is well below its EPA Region 9 Tap Water PRG of 370 µg/L. Therefore, the potential risks to workers at the ChevronTexaco Asphalt property were not evaluated further in this HHRA.

#### **1.3.1.6 TPH**

TPH have been identified as soil and groundwater COPCs. However, due to the current lack of toxicity data for diesel or oil as a whole (each fuel type is a complex mixture of hundreds of chemical compounds), these fuels were not quantitatively evaluated in the HHRA. Instead, we focused on individual petroleum constituents within these fuel types for which appropriate toxicity data are available. DEQ's revised public comment draft of the Risk-Based

Decision Making for the Remediation of Petroleum-Contaminated Sites (RBDM) guidance (DEQ 2003) includes risk-based concentrations (RBCs) for gasoline, diesel, and mineral insulating oil, which are discussed in the uncertainty section as part of the TPH qualitative evaluation.

### **2.3.2 Conceptual Site Model**

The conceptual site model (CSM) is based on an evaluation of existing data and the current and reasonably likely future conditions at the site (Figures 7 and 8). This model provides the framework for assessing potential exposure pathways to be considered in the risk assessments. The draft CSM presented in the RI work plan was revised based on the RI data and presented as Figure 3-1 in the draft RI. The final CSMs (current and future conditions; Figures 7 and 8) address DEQ's comments on the draft RI as discussed in the "Comment Response Document" prepared by KHM (August 15, 2002).

To be considered complete, an exposure pathway must have: (1) an identified source of COPCs; (2) a release/transport mechanism from the source; and (3) a receptor to whom contact can occur. At this site, likely or potential sources include accidental fuel releases, fuel storage, and underground fuel piping.

**Potentially Exposed Populations.** Available information and data collected for the RI were used to summarize the site history and to characterize aspects of the physical setting (e.g., climate, vegetation, soil type, and groundwater hydrology) that are relevant to the baseline HHRA. Potentially exposed populations also were identified.

Current and future land and water use was evaluated as part of the land and water use determination presented in the RI Report. The site is expected to continue to operate indefinitely as a petroleum storage and distribution facility. Future residential development of the site is considered extremely unlikely; consequently, potential future residential scenarios were not evaluated. The site is zoned as industrial, and because it currently is an operating facility, it is expected to continue to be zoned as industrial in the foreseeable future. Based on currently available information, the following current exposure scenarios were identified at the site:

Human receptors that were evaluated quantitatively in the baseline HHRA comprise site workers (indoor and outdoor), trench workers, utility workers, and landscape workers. Off-site workers were evaluated qualitatively in the HHRA. As discussed in the "Comment Response Document", the HHRA completed at this site was limited to upland exposure scenarios and receptors. This is consistent with the manner in which other RIs are being conducted within the

Portland Harbor CERCLA Site. All issues related to in-water exposure and potential human health risks will be evaluated during future CERCLA activities associated with the Portland Harbor Superfund Site. Therefore, recreational river users are not evaluated in this HHRA.

Exposures to residents living off site and trespassers were considered to be less significant than on-site worker exposures; therefore, these receptors were not evaluated quantitatively in the baseline HHRA. Additionally, as discussed in the August 2002 "Comment Response Document," the potential for trespassers to be present on the Willbridge Terminal is remote or impossible due to increased security measures put in place post September 11, 2001, at petroleum bulk terminals nationwide. At the current time, there is fencing encircling the majority of the Willbridge Terminal and the increased presence of security personnel and equipment (e.g., security video cameras) to ensure that trespassing does not occur at this facility.

**Potentially Complete Exposure Routes.** Exposure pathways for quantitative analysis were selected based on the final CSM developed for this site. Based on available information, the exposure pathways quantitatively evaluated in this HHRA are:

- Incidental ingestion of soil (all receptors);
- Dermal contact with soil (all receptors);
- Inhalation of particulates from soil (all receptors);
- Inhalation of VOCs from groundwater (all receptors; indoor and outdoor for site workers; outdoor air only for trench, utility, and landscape workers).
- Inhalation of VOCs from soil (all receptors; indoor and outdoor for site workers; outdoor air only for trench, and utility workers); and
- Direct contact with shallow groundwater (trench and utility workers only).

In the CSM, red boxes indicate complete exposure pathways that were evaluated quantitatively or qualitatively in this baseline HHRA. An "n" indicates incomplete or insignificant exposure pathways that were not evaluated in the HHRA. Finally, a red "X" is used to indicate complete exposure pathways that will be evaluated in conjunction with CERCLA activities (Figures 7 and 8).

### 2.3.3 Development of Exposure Point Concentrations

Exposure point concentrations (EPCs) represent the chemical concentrations in the soil and groundwater that the receptor will potentially contact during the

exposure period. The EPCs for the site's COPCs were derived from either data obtained from sampling or from a combination of sample data and fate and transport modeling. For example, air EPCs were modeled from soil EPCs to evaluate the inhalation of particulates pathway.

The site worker (i.e., industrial worker) scenario was evaluated based on exposure to surface soil (0 to 3 feet below ground surface [bgs]), while the trench worker and utility worker scenario considered direct exposure to surface and subsurface soil (0 to 15 feet bgs; referred to as total soil in this HHRA). These definitions of surface and subsurface soil are consistent with DEQ guidance (DEQ, 2003). Subsurface soil data were used when evaluating the soil-to-indoor/outdoor air exposure pathways for all receptors. Soil at each OU has been identified as surface soil (0 to 1 feet bgs for the purposes of the RI, though it is defined as 0 to 3 feet bgs for the HHRA), vadose zone soil, capillary fringe soil, and saturated zone soil. Soil samples identified as being in the saturated zone, even if they were collected at a depth of less than 15 feet bgs, were not considered in the HHRA. The samples included in each soil and groundwater data set are identified in Attachment A.

In accordance with EPA guidance (EPA 1989) for chemicals detected at one sampling location but not at others, a proxy concentration equal to half the SQL was used to represent the COPC concentration in each sample where it was not detected.

The 90 percent upper confidence limit (UCL) on the arithmetic mean concentration of COPCs in each environmental medium of concern was used to evaluate the reasonable maximum exposure (RME) scenario, while the arithmetic mean was used to evaluate the central tendency (CT) exposure scenario (EPA 1989). The use of the 90 percent UCL as the RME EPC is consistent with DEQ Guidance (DEQ, 2000) and OAR 340-122-084. The RME scenario is intended to be a conservative estimate of potential exposure, while the CT exposure scenario is intended to be a more realistic exposure scenario. Using both the RME and CT allows for a range of potential risk and hazard estimates. The 90 percent UCL is calculated based on EPA (1992, 1997b, 2002b, and 2003b) guidance. The manner of calculating the 90 percent UCL was as follows:

- As a first step, the underlying distribution of the data was evaluated using the Shapiro and Wilk W-Test (Gilbert 1987) to determine if the data are normal or lognormal. If the normal and lognormal distributions are indicated, the 90 percent UCL was calculated appropriately. The data distribution is not evaluated when the frequency of detection is less than 10 percent. In these cases, the maximum detected concentration was used as the RME EPC.

- If the normality test rejects both normal and lognormal distributions at a significance level of 95 percent, the test was rerun by adjusting the W-Test quantile downward by 0.1 from the original quantile (providing a greater tolerance for accepting a distribution). If the data set conformed to a normal or lognormal distribution with the greater tolerance, the distribution was reported as weak lognormal (or weak normal).
- If the normal and lognormal distributions were rejected with the greater tolerance, the data were evaluated following recent EPA exposure point concentration guidance (EPA 1997b, 2002b, and 2003b). We used EPA's ProUCL Version 2.1 excel spreadsheet program to calculate nonparametric UCLs for most COPCs. The maximum detected concentration was used as the RME EPC for some of the less toxic COPCs instead of a nonparametric UCL (the distribution for these COPCs is identified as "Default to Maximum" in the EPC tables (Tables 8 through 11). As recommended in the ProUCL Users Guide (EPA 2003b), we used the Chebyshev (Mean, Std) UCL when a nonparametric UCL was required. ProUCL "General Statistics" tables are included in Attachment C. These tables present the summary statistics for each data set evaluated along with the nonparametric 90 percent UCLs.
- In cases where the 90 percent UCL or the calculated mean concentration exceeded the maximum detected value (which can occur in data sets with a large variance), the maximum detected value was used to define the upper limit of this range.

EPCs for this HHRA are presented in Tables 8, 9, and 10 for the KMLT, ChevronTexaco, and ConocoPhillips OUs. The EPCs for the Utility Corridor are presented in Table 11.

**Elevated SQLs and Anomalous Results.** The ChevronTexaco groundwater data set contains elevated SQLs for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene in up to six samples collected in 1997 or 1998. These SQLs are considered elevated because they are at least two times greater than the maximum detected concentration for these seven PAHs. The SQLs range from 10 to 50 µg/L, while the maximum detected concentrations range from 1.3 to 3.42 µg/L (not including naphthalene). The six samples with elevated SQLs are as follows: B-7 (collected in November 1998), B-10 (November 1998), B-15 (October 1997), B-19 (October 1997), B-24 (November 1998), and B-31 (October 1997). Three of these samples had SQLs or detections of these PAHs in other monitoring rounds that were significantly (greater than 10 times) lower than these elevated SQLs. Given the maximum detected concentrations in the remaining 94 to 96 groundwater samples collected at the ChevronTexaco Site, the elevated SQLs for the other three samples (B-15, B-19,

and B-31, which were only sampled once) artificially elevate the ChevronTexaco groundwater EPCs. Therefore, the elevated SQLs for these seven PAHs were not included in the Chevron groundwater data set to calculate EPCs. For the reasons described previously, the removal of these SQLs is not expected to lead to an underestimation of risk at the ChevronTexaco site.

Lead was reportedly detected at a concentration of 303 mg/L in the groundwater sample collected on February 23, 2001, from monitoring well U-3 on the ConocoPhillips site. Lead was detected at concentrations of 0.0167 and 0.00427 mg/L at the same well in the sampling rounds before and after the February 2001 sampling round, respectively. The lead result of 303 mg/L appears to be either anomalous or a laboratory error and was not included in the ConocoPhillips groundwater data set.

### **2.3.4 Fate and Transport Modeling**

Several of the pathways evaluated in this risk assessment were evaluated using the risk-based concentrations (RBCs) calculated using DEQ's RBDM models (DEQ, 2003). These pathways included inhalation of VOCs from soil (indoor and outdoor air), inhalation of VOCs from groundwater (indoor and outdoor air), and direct contact with shallow groundwater (includes inhalation of volatiles).

The RBCs that are used in this HHRA, along with the supporting chemical, toxicological, and exposure data, are presented in Attachment D. The chemical data for the COPCs were obtained from EPA's Soil Screening Guidance (EPA 1996) and the EPA Region 9 PRGs (EPA 2002a), the toxicity data were obtained from EPA's toxicity databases (EPA 1997a and 2003a), the dermal contact parameters were obtained from EPA's Dermal Exposure Assessment guidance (EPA 2001), and the exposure factors were obtained from DEQ's revised (public comment draft) RBDM guidance (DEQ 2003). The only OU-specific exposure factor used in this HHRA was depth to groundwater: KMLT (8.7 feet), ChevronTexaco (11.6 feet), and ConocoPhillips (16.9 feet). The depth to groundwater used for each OU is the average depth to groundwater across the entire OU using groundwater data from February 2000 through 2003. The depth to groundwater for ConocoPhillips OU is actually deeper than the 15 feet soil column evaluated for the trench worker.

Ambient outdoor air concentrations of fugitive dust generated from soil were calculated using the particulate emission factor (PEF) equation from EPA (1996) and DEQ (2000) guidance. The default PEF of  $1.32 \times 10^9$  m<sup>3</sup>/kg was used for this HHRA. Ambient outdoor air concentrations based on volatilization from surface soil were calculated using the volatilization factor (VF) equation from EPA (1996) and DEQ (2000) guidance. The default VFs presented in EPA



(2002a) were used for this HHRA. The formulae used to estimate outdoor air concentrations using the PEFs and VFs are presented in the appropriate risk calculation tables presented in Attachment B.

### 2.3.5 Exposure Factors

Exposure factors describe the exposed population (e.g., contact rate, exposure frequency and duration, body weight) and are used together with chemical concentrations to estimate the amount of chemical intake by potential receptors. Where available, exposure factors were selected using standard default exposure factors presented in DEQ guidance (2000 and 2003).

The following paragraphs describe the exposure pathways evaluated in this baseline human health risk assessment.

**Incidental Soil Ingestion.** Incidental ingestion of soil is often a primary route of exposure to particulate-bound chemicals. Individuals ingest small amounts of soil as a result of hand-to-mouth behavioral patterns that may follow soil contact activities. Reasonable maximum exposure (RME) and central tendency (CT) factors applicable to this pathway are listed in Table 12.

**Dermal Soil Contact and Absorption.** In addition to leading to incidental soil ingestion, soil contact can also result in absorption of some chemicals directly through the skin. RME and CT exposure factors for the dermal contact pathway are listed in Table 13. Dermal absorption factors were selected from EPA guidance (2001).

**Air Inhalation.** Individuals may be exposed to chemicals present in soil and groundwater from inhalation of vapors or dust. RME and CT factors applicable to the inhalation exposure pathway are summarized in Table 14 (Inhalation of Dust) and Table 15 (Inhalation of Volatiles). Additional parameters that were used in running DEQ's Risk-Based Decision Making model to calculate air RBCs are presented in Attachment D.

**Dermal Contact with Groundwater.** During trenching or utility excavating activities, groundwater contact can result in absorption of compounds of potential concern directly through the skin. RME and CT exposure factors for this pathway are summarized in Table 16 and Attachment D.

**Site, Trench, and Utility Worker Scenarios.** The RME exposure equations used in this baseline HHRA were based on the assumption that 100 percent of the contaminants contacted was derived from the site. Consequently, the fraction ingested, inhaled, or contacted at each OU was assumed to be 1.0 for these

exposure scenarios. For the CT exposure scenario, these workers were assumed to contact contaminated media for 2 hours of every 8-hour workday. Therefore, the fraction ingested, inhaled, or contacted from the contaminated source was assumed to be 0.25 (i.e., 2 hours/8 hours).

## **2.4 Toxicity Assessment**

The objectives of the toxicity assessment are to evaluate the inherent toxicity of the compounds under investigation and to identify and select toxicological measures for use in evaluating the significance of the exposure. These toxicological measures or criteria were used in conjunction with intake rates for chemicals of concern in the risk characterization process of the HHRA.

Standard HHRA toxicity databases were used to derive health-based toxicity criteria. The hierarchy of sources for toxicity criteria for use in this risk assessment follows that presented in OAR 340-122-084. The hierarchy of toxicity criteria is as follows:

- (1) EPA's Integrated Risk Information System (IRIS), on-line database;
- (2) EPA's Health Effects Assessment Summary Table (HEAST);
- (3) EPA-NCEA Superfund Health Risk Technical Support Center (as referenced in EPA Region 9 PRGs [EPA 2002a]);
- (4) Other U.S. EPA documents or databases;
- (5) ATSDR minimal risk levels (MRLs); and
- (6) Other professionally peer-reviewed documents as needed and as approved by DEQ.

### **2.4.1 Types of Toxicity Values for Quantifying Risks**

Toxicity and risk assessments vary for different chemicals depending upon whether non-carcinogenic or carcinogenic responses (i.e., endpoints) are used to assess potential risks. These criteria, in turn, are based on the endpoints observed from laboratory or epidemiological studies with the chemicals. Some chemicals of concern may result in both non-carcinogenic and carcinogenic effects, although in many cases the EPA has published toxicity criteria for only the most sensitive type of toxic effect supporting the most restrictive toxicological criteria.

**Reference Doses.** Reference doses (RfDs) are used to quantitatively evaluate non-carcinogenic toxicity of a specific chemical. RfDs are established at levels

associated with no adverse effect—the "no observed adverse effect level" (NOAEL). In general, the RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime.

RfDs are developed from an analysis of the available toxicological literature from which a critical study is selected. The selection of a critical study is made by professional judgment and considers factors such as the quality of the study, the relevance of the study to human exposures, and other factors. Good quality human toxicological data are preferred to animal studies. If human data are not available, the study on the most sensitive species is selected as the critical study. Similarly, the toxic effect manifested at the lowest exposure level is (generally) selected as the critical effect. The RfDs used in this risk assessment are summarized in Table 17.

**Cancer Slope Factors.** The toxicity of potential human carcinogens is evaluated differently. It is assumed for carcinogens that no threshold concentrations exist below which adverse effects may not occur. Probabilistic methods based on chemical-specific dose-response curves are used to establish slope factors (SFs), which are then used to quantify potential risks from exposure to carcinogens. Dose-response curves are generated in laboratory studies using high chemical concentrations. The dose-response curve is fitted to a linearized multistage model that extrapolates the slope of the curve from high experimental concentrations to low concentrations at which people are typically exposed. The final SF is based on the 95 percent UCL of the extrapolated slope of the dose-response curve. Because of the non-threshold assumption and the UCL statistical procedure, the use of published SFs provides a conservative upper-bound estimate of potential risks associated with exposure. The SFs used in this risk assessment are summarized in Table 18.

## **2.4.2 Modification of Oral Toxicity Values for Evaluating Dermal Exposure**

Oral toxicity values are expressed as administered doses. When evaluating dermal exposure to contaminants from soil and water, it is necessary to adjust the oral toxicity value (which is based on an administered dose) to one based on an absorbed dose using a chemical's oral absorption efficiency. EPA's recommended gastrointestinal (GI) absorption values for those compounds with chemical-specific dermal absorption factors from soil are presented in Exhibit 4-1 of EPA's dermal risk assessment guidance (RAGs Part E; EPA 2001). EPA recommends that an assumption of 100 percent GI absorption for inorganics

not included in Exhibit 4-1. The only COPCs identified at this site with EPA-approved GI absorption factors are cadmium and chromium (both 2.5 percent).

### **2.4.3 Toxicity Assessment for Lead**

Lead is a unique chemical in its pharmacokinetic and toxicological properties. Although classified as both a potential carcinogen (B2 weight of evidence) and a non-carcinogen, lead is most often assessed as a non-carcinogen only, since these effects manifest themselves at doses lower than those for carcinogenicity. However, in contrast to the assumption of the existence of a threshold for non-carcinogenic responses, there does not appear to be a threshold below which lead does not exert a response.

Currently, the EPA provides neither a reference dose for evaluating the non-carcinogenic effects (unrelated to cancer) nor a slope factor for evaluating the carcinogenic effects for lead. EPA has developed an exposure model for lead that considers both its biokinetics and toxicological properties. This model, the Integrated Exposure Uptake and Biokinetic (IEUBK) model, integrates the intake of lead from multiple sources, including soil, food, and water ingestion, inhalation, and, when appropriate, maternal contributions. Intakes are assessed for children from ages 0 (birth) to seven. The model does not assess lead intakes for older children or adults. Childhood exposure to lead is the focus of this model because this receptor group is recognized as the most sensitive to the non-carcinogenic effects of inorganic lead. Therefore, to evaluate lead exposures at the Willbridge Terminal, we will use other criteria as described below.

Soil exposures at the site are limited to site workers contacting surface soil and trench/utility workers contacting soil during trenching or utility activities. We screened the soil lead concentrations against the adult soil screening level for lead (750 mg/kg) to evaluate site worker and trench/utility worker exposures (EPA, 2002a). Note that lead was not identified as a soil COPC at the three OUs or the utility corridor.

Lead has been detected in groundwater at the site. However, as dermal contact to trench and utility workers is the only potential route of exposure to lead in groundwater, and DEQ guidance (DEQ, 2003) states that the "potential risk to utility workers from incidental exposure to lead in groundwater is minimal," lead in groundwater will not be further evaluated in this HHRA.

### **2.4.4 Toxicity Assessment for Total Petroleum Hydrocarbons (TPH)**

Determining appropriate toxicity values for TPH (a class of compounds identified as a preliminary COPC at this site) is difficult because of the

characteristics of TPH. TPH are a complex mixture of hundreds or more individual alkanes, cycloalkanes, alkenes, aromatics, and other petroleum substances. For this HHRA, the human health risks associated with TPH were evaluated using an indicator approach. The indicators refer to single compounds within TPH known or believed to be carcinogenic and non-carcinogenic and which are evaluated individually. The indicator compounds that were quantitatively evaluated in this HHRA are:

- **Volatile Organic Compounds (VOCs):** benzene, toluene, ethylbenzene, xylene, 1,2-dibromoethane (EDB), 1,2-dichloroethane (EDC), iso-propylbenzene, n-propylbenzene, 1,2,4-trimethylbenzene, and 1,3,5, trimethylbenzene;
- **Polynuclear Aromatic Hydrocarbons (PAHs):** acenaphthene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, ideno(1,2,3-cd)pyrene, naphthalene, and pyrene; and
- **Metals:** Lead.

#### 2.4.5 Surrogate Toxicity Values

Surrogate toxicity values were used in this risk assessment to identify COPCs for chemicals without toxicity values. Surrogate compounds were selected based on chemical structures and similar toxicological properties or metabolism. The following surrogates were used in this risk assessment: acenaphthene (for acenaphthylene), pyrene (for benzo[g,h,i]perylene), anthracene (for phenanthrene), naphthalene (for 2-methylnaphthalene).

### 2.5 Risk Characterization

Risk characterization is the process of comparing the chemical intake by a receptor to the toxicity of the chemical. This comparison is expressed either as a hazard index (non-carcinogens) or an excess lifetime risk of cancer (carcinogens). These two methods for completing the risk characterization are described in Section 2.5.1. Section 2.5.2 summarizes the results of the risk characterization.

#### 2.5.1 Methods Used to Quantify Risks

As discussed in Section 2.4.1, non-carcinogenic chemical effects are quantitatively evaluated using an RfD, while carcinogenic chemical effects are evaluated using an SF. Potential risks and hazards were calculated using either the Intake Method or the RBC Method, depending on the exposure pathway being evaluated.

## Intake Method

The intake method was used for soil ingestion, dermal contact with soil, inhalation of particulates, inhalation of volatiles from surface or total soil (outdoor air only), and dermal contact with groundwater (metals only).

**Non-Carcinogenic Effects.** For non-carcinogens, the daily intake of each compound resulting from site exposure is divided by the available RfD value for the compound, to compute a hazard quotient (HQ) as follows:

$$\text{Hazard Quotient} = \text{CDI}/\text{RfD}$$

where:

CDI = Chronic daily intake; the estimated exposure level over a given time period in mg/kg-day.

RfD = Reference Dose; the exposure level that is likely to be without deleterious effects during a given time increment in mg/kg-day.  
Only chronic RfDs were used for this risk assessment.

**Carcinogenic Effects.** For carcinogenic chemicals, an estimated excess lifetime cancer risk is calculated using:

$$\text{Risk} = \text{CDI} \times \text{SF}$$

where:

CDI = Chronic daily intake; the estimated lifetime exposure level in mg/kg-day.

SF = Slope Factor; the upper-bound estimate of the probability of a cancer response per unit of intake of a chemical over a lifetime, expressed as (mg/kg-day)<sup>-1</sup>.

## RBC Method

The RBC Method was used to evaluate the inhalation of volatiles that have migrated from soil to indoor air, subsurface soil to outdoor air, and groundwater *in-situ* to indoor and outdoor air. In addition, the trench and utility worker exposure to groundwater via dermal contact and inhalation of volatiles was evaluated using the RBC Method.

**Non-Carcinogenic Effects.** For each non-carcinogen, the EPC is divided by the non-carcinogenic RBC to compute a hazard quotient (HQ) as follows:

$$\text{Hazard Quotient} = \text{EPC}/\text{RBC}$$

where:

EPC = Exposure point concentration in mg/kg or µg/L.

RBC = Risk-based concentration in mg/kg or µg/L. The RBCs are calculated based on a Hazard Quotient of 1.

**Carcinogenic Effects.** For each carcinogen, the EPC is divided by the carcinogenic RBC, and is then multiplied by DEQ's acceptable risk level of  $1 \times 10^{-6}$  to compute the risk estimate as follows:

$$\text{Risk} = (\text{EPC}/\text{RBC}) \times (1 \times 10^{-6})$$

where:

EPC = Exposure point concentration in mg/kg or µg/L.

RBC = Risk-based concentration in mg/kg or µg/L. These RBCs are calculated based on a cancer risk level of  $1 \times 10^{-6}$ .

**Cumulative Hazard and Risk Estimates.** For simultaneous exposure to multiple COPCs with similar toxic effect or target organ, a Hazard Index (HI) is calculated as the sum of chemical-specific HQs. A toxic effect is considered possible if an HI or HQ exceeds 1 (OAR 340-122-115).

For simultaneous exposure to multiple COPCs, individual risk estimates are summed to provide pathway, media, and receptor total risk estimates. Combining potential cancer risks as a result of exposure to multiple chemicals through multiple exposure pathways assumes the following:

- Exposure to all COPCs will result in the same effect (cancer); and
- Each COPC exerts its effect independently (i.e., there is no synergism or antagonism).

OAR 340-122-115 considers  $1 \times 10^{-6}$  and  $1 \times 10^{-5}$  to be acceptable risk levels for individual and multiple carcinogens, respectively.

## 2.5.2 Baseline Risks and Hazards (Excluding Lead)

Risk and hazard estimates for the KMLT OU, ChevronTexaco OU, ConocoPhillips OU, and the Utility Corridor are discussed in Sections 2.5.2.1 through 2.5.2.4. As discussed previously, risks and hazards are evaluated for each OU and the utility corridor. Risk and hazard estimate calculations for each area, exposure pathway, and receptor are presented in Attachment B (Tables B-1 through B-11). Risk and hazard summaries are presented in Tables 19 through 24.

### 2.5.2.1 KMLT Risk and Hazard Estimates

The exposure pathways that were quantitatively evaluated at the KMLT OU are soil ingestion, dermal contact with soil, inhalation of particulates and VOCs, and dermal contact with groundwater. Table 19 presents the KMLT OU risk and hazard summary for each exposure scenario (summed by individual exposure pathways), while Table 20 presents the RME risk and hazard summary for select exposure scenarios (summed by individual COPCs). Risks and hazards are only included in Table 20 if the exposure scenario total or individual COPC risks or hazard estimates exceed DEQ acceptable levels. Additionally, only COPCs with cancer risks equal to or greater than  $1 \times 10^{-7}$  or hazard indices greater than 0.1 are included in Table 20.

**Site Worker.** The cumulative RME and CT excess lifetime cancer risks for the site worker are estimated to be  $2 \times 10^{-5}$  and  $2 \times 10^{-7}$ , respectively. The RME risk estimate is slightly greater than the OAR 340-122 acceptable level of  $1 \times 10^{-5}$  for cumulative carcinogenic risk. The primary exposure pathways (RME evaluation) are soil ingestion (risk =  $1 \times 10^{-5}$ ) and dermal contact with soil (risk =  $4 \times 10^{-6}$ ). The primary COPCs (those COPCs with risk estimates that exceed DEQ acceptable risk level of  $1 \times 10^{-6}$  for individual carcinogens) are benzo(a)pyrene (risk =  $9 \times 10^{-6}$ ), and arsenic (risk =  $7 \times 10^{-6}$ ).

Benzo(a)pyrene was detected in 11 of 29 surface soil samples at the KMLT OU with a maximum detection of 8.74 mg/kg and a 90 percent UCL of 2.4 mg/kg. The DEQ occupational RBC for surface soil is 0.27 mg/kg. Arsenic was detected in all five surface soil samples with a maximum detection of 10.5 mg/kg, which slightly exceeds the State of Washington natural background level of 7 mg/kg (Ecology 1994). The average arsenic concentration in surface soil at the KMLT OU is 5.8 mg/kg, which is below the State of Washington natural background level of 7 mg/kg.

The cumulative RME and CT HIs for the site worker are estimated to be 0.07 and 0.003, respectively. The RME and CT HIs are less than the DEQ acceptable HI of 1.0.



**Trench Worker.** The cumulative RME and CT excess lifetime cancer risks for the trench worker are estimated to be  $2 \times 10^{-6}$  and  $1 \times 10^{-7}$ , respectively. The RME and CT risk estimates are less than the DEQ acceptable level of  $1 \times 10^{-5}$  for cumulative carcinogenic risk. No cancer risk estimates for individual COPCs exceed  $1 \times 10^{-6}$ . Therefore, no unacceptable carcinogenic risks are predicted for trench workers at the KMLT OU.

The cumulative RME and CT HIs for the trench worker are estimated to be 2 and 0.3, respectively. The RME HI exceeds the DEQ acceptable HI of 1.0. The primary exposure pathway is inhalation of volatiles and dermal contact with groundwater. The primary COPCs (those COPCs with an HI equal to or greater than 0.1) are 1,2,4-trimethylbenzene (HI = 1), 2-methylnaphthalene (HI = 0.2), 1,3,5-trimethylbenzene (HI = 0.1), benzene (HI = 0.1), and naphthalene (HI = 0.1). The EPCs for these five COPCs are driven by their maximum detected concentrations, which were all detected at MW-11 in December 1998. 1,2,4-trimethylbenzene was not detected in the other nine groundwater samples that were analyzed for VOCs. The average 1,2,4-trimethylbenzene groundwater concentration at the KMLT OU is 140  $\mu\text{g/L}$ , while the maximum detected concentration is 1,400  $\mu\text{g/L}$ . The predicted RME HI for the trench worker likely overestimates actual hazards at the site as the HI was calculated based on a maximum detected concentration that is an order of magnitude higher than the mean concentration of the primary COPC. If the maximum concentration of 1,2,4-trimethylbenzene was not used as the RME EPC estimate, the noncarcinogenic risk to trench workers at the KMLT OU would be acceptable.

**Landscape Worker.** As discussed previously, no soil COPCs were identified for the landscape worker data set at the KMLT OU. Additionally, because the groundwater is deeper than the depth of any expected landscape excavation, the only complete exposure pathway for landscape workers is inhalation of volatiles from groundwater (outdoor air).

The cumulative RME and CT excess lifetime cancer risks for the landscape worker are estimated to be  $5 \times 10^{-7}$  and  $1 \times 10^{-7}$ , respectively. The RME and CT risk estimates are less than the DEQ acceptable level of  $1 \times 10^{-5}$  for cumulative carcinogenic risk. The cumulative RME and CT HIs for the landscaper worker are estimated to be 0.01. The RME and CT HIs are less than the DEQ acceptable HI of 1.0. Therefore, no unacceptable risks are predicted for landscape workers at the KMLT OU.

**Summary.** The cancer risk estimates for the site worker (risk =  $2 \times 10^{-5}$ ) are driven by benzo(a)pyrene (risk =  $9 \times 10^{-6}$ ) and arsenic (risk =  $7 \times 10^{-6}$ ). The arsenic risk estimates were calculated using the maximum detected surface soil

concentration and the average arsenic concentration in surface soil at the KMLT OU is less than the State of Washington arsenic background level.

The noncarcinogenic hazard estimates for the trench worker ( $HI = 2$ ) are driven by VOC detections in MW-11, which was sampled in December 1998. The primary COPC (1,2,4-trimethylbenzene [ $HI = 1$ ]) was not detected in any other KMLT OU groundwater sample. No unacceptable risks are predicted for landscape workers at the KMLT OU.

### **2.5.2.2 ChevronTexaco Risk and Hazard Estimates**

The exposure pathways that were quantitatively evaluated at the ChevronTexaco OU are soil ingestion, dermal contact with soil, inhalation of particulates and VOCs, and dermal contact with groundwater. ChevronTexaco OU risks and hazards were initially estimated for the entire OU. Risks and hazards for groundwater-related exposure pathways were then estimated for the Non-ChevronTexaco Ethanol Area and the ChevronTexaco Ethanol Area. As discussed previously, subsurface soil data in the ChevronTexaco Ethanol Area were not evaluated since this area is currently undergoing active remediation.

Table 21 presents the ChevronTexaco OU risk and hazard summary for each exposure scenario (summed by individual exposure pathways), while Table 22 presents the RME risk summary for select exposure scenarios (summed by individual COPCs). Risks are only included in Table 22 if the exposure scenario total or individual COPC risks exceed DEQ acceptable levels. Additionally, only COPCs with cancer risks equal to or greater than  $1 \times 10^{-7}$  are included in Table 22.

**Site Worker.** The cumulative RME and CT excess lifetime cancer risks for the site worker are estimated to be  $5 \times 10^{-6}$  and  $8 \times 10^{-8}$ , respectively (Table 21). The RME and CT risk estimates are less than the OAR 340-122 acceptable level of  $1 \times 10^{-5}$  for cumulative carcinogenic risk. The primary exposure pathways (RME evaluation) are soil ingestion (risk =  $1 \times 10^{-6}$ ) and inhalation of volatiles from groundwater (indoor air; risk =  $3 \times 10^{-6}$ ). The primary COPC (those COPCs with risk estimates that exceed DEQ acceptable risk level of  $1 \times 10^{-6}$  for individual carcinogens) is benzene (risk =  $4 \times 10^{-6}$ ).

Because the subsurface soil and groundwater are heavily contaminated in the ChevronTexaco Ethanol Area, risks and hazards associated with groundwater-related pathways were also evaluated separately for the Non-ChevronTexaco Ethanol Area and the ChevronTexaco Ethanol Area. As shown in Table 9, the VOC groundwater EPCs are significantly lower in the Non-ChevronTexaco Ethanol Area. For example, the RME benzene EPCs are 370  $\mu\text{g/L}$  for the Non-ChevronTexaco Ethanol Area and 14,000  $\mu\text{g/L}$  for the ChevronTexaco Ethanol Area.

Table 22 presents RME risk summaries for the two areas. The cumulative carcinogenic risks for the Non-ChevronTexaco Ethanol Area is  $2 \times 10^{-6}$ . In the Non-ChevronTexaco Ethanol Area, individual and total carcinogenic risk estimates are acceptable. The individual carcinogenic risk for benzene in the Non-ChevronTexaco Ethanol Area is  $2 \times 10^{-7}$ . The cumulative carcinogenic site risks for the ChevronTexaco Ethanol Area is  $8 \times 10^{-6}$ . The individual carcinogenic risk from benzene in the ChevronTexaco Ethanol Area is  $6 \times 10^{-6}$ , though the majority of this predicted risk ( $5 \times 10^{-6}$ ) is from the indoor inhalation exposure pathway. Because this area is undergoing active subsurface soil remediation with a soil vapor extraction system, the migration of VOCs from groundwater to indoor air in this area should be short-circuited by the remediation system as it would extract vapors emanating from groundwater as well as subsurface soil and this exposure pathway would be considered incomplete.

The cumulative RME and CT HIs for the site worker are estimated to be 0.07 and 0.006, respectively. The RME and CT HIs are less than the DEQ acceptable HI of 1.0.

**Trench Worker.** The cumulative RME and CT excess lifetime cancer risks for the trench worker are estimated to be  $7 \times 10^{-6}$  and  $6 \times 10^{-7}$ , respectively. The RME and CT risk estimates are less than the DEQ acceptable level of  $1 \times 10^{-5}$  for cumulative carcinogenic risk. The primary exposure pathway is inhalation of volatiles and dermal contact with groundwater (risk =  $7 \times 10^{-6}$ ). The primary COPC (those COPCs with risk estimates that exceed DEQ acceptable risk level of  $1 \times 10^{-6}$  for individual carcinogens) is benzene (risk =  $5 \times 10^{-6}$ ).

Table 22 presents the RME risk summaries for the Non-ChevronTexaco Ethanol Area and the ChevronTexaco Ethanol Area. The cumulative carcinogenic risks for the two areas are  $4 \times 10^{-6}$  and  $2 \times 10^{-5}$ , respectively. The benzo(a)pyrene risk in the Non-ChevronTexaco Ethanol Area increases from  $1 \times 10^{-6}$  to  $3 \times 10^{-6}$  because the maximum detected concentration was used as the EPC in the Non-ChevronTexaco Ethanol Area. The use of the maximum detected benzo(a)pyrene concentration likely overestimates risk to trench workers.

The cumulative RME and CT HIs for the trench worker are estimated to be 0.4 and 0.06, respectively. The RME and CT HIs are less than the DEQ acceptable HI of 1.0.

**Landscape Worker.** As discussed previously, no soil COPCs were identified for the landscape worker data set at the ChevronTexaco OU. Additionally, because the groundwater is deeper than the depth of any expected landscape

excavation, the only complete exposure pathway for landscape workers is inhalation of volatiles from groundwater (outdoor air).

The cumulative RME and CT excess lifetime cancer risks for the landscape worker are estimated to be  $1 \times 10^{-7}$  and  $3 \times 10^{-8}$ , respectively. The RME and CT risk estimates are less than the DEQ acceptable level of  $1 \times 10^{-5}$  for cumulative carcinogenic risk. The cumulative RME and CT HIs for the landscaper worker are estimated to be 0.001. The RME and CT HIs are less than the DEQ acceptable HI of 1.0. Therefore, no unacceptable risk is predicted for landscape workers at the ChevronTexaco OU.

**Summary.** The cancer risk estimates for both the site worker and trench worker are driven by high concentrations of benzene detected in groundwater at the ChevronTexaco Ethanol Area. Risks to the site worker, both cumulative carcinogenic and by individual COPC, are acceptable at the Non-ChevronTexaco Ethanol area if arsenic is excluded from the risk calculations. The maximum detected arsenic concentration in surface soil at the ChevronTexaco OU is less than the State of Washington arsenic background level. The individual carcinogenic risk from benzene at the ChevronTexaco Ethanol Area (risk =  $6 \times 10^{-6}$ ) is greater than the DEQ acceptable level for individual COPCs.

Cumulative carcinogenic risks to trench workers are acceptable over the entire site and at the Non-ChevronTexaco Ethanol Area. Cumulative carcinogenic risks to trench workers slightly exceed DEQ acceptable risk levels at the ChevronTexaco Ethanol Areas. Benzene risks are acceptable at the Non-ChevronTexaco Ethanol Area and unacceptable (i.e., greater than  $1 \times 10^{-6}$ ) at the ChevronTexaco Ethanol Area. However, the benzene risks are driven by the indoor inhalation exposure pathway and as this area is undergoing active subsurface soil remediation, this pathway is considered incomplete. The risks from dermal contact with benzo(a)pyrene in groundwater are unacceptable at both subareas; however the Non-ChevronTexaco Ethanol benzo(a)pyrene groundwater EPC is the maximum detected concentration that likely overestimates risks to trench workers.

#### **2.5.2.3 ConocoPhillips Risk and Hazard Estimates**

The exposure pathways that were quantitatively evaluated at the ConocoPhillips OU are soil ingestion, dermal contact with soil, inhalation of particulates and VOCs, and dermal contact with groundwater. Table 23 presents the ConocoPhillips OU risk and hazard summary for each exposure scenario (summed by individual exposure pathways).

**Site Worker.** The cumulative RME and CT excess lifetime cancer risks for the site worker are estimated to be  $1 \times 10^{-6}$  and  $1 \times 10^{-8}$ , respectively. The RME and CT risk estimates are less than the OAR 340-122 acceptable level of  $1 \times 10^{-5}$  for cumulative carcinogenic risk. No cancer risk estimates for individual COPCs exceed  $1 \times 10^{-6}$ .

The cumulative RME and CT HIs for the site worker are estimated to be 0.01 and 0.001, respectively. The RME and CT HIs are less than the DEQ acceptable HI of 1.0. Therefore, there are no unacceptable risks predicted for site workers at the ConocoPhillips OU.

**Trench Worker.** The cumulative RME and CT excess lifetime cancer risks for the trench worker are estimated to be  $2 \times 10^{-6}$  and  $2 \times 10^{-7}$ , respectively. The RME and CT risk estimates are less than the DEQ acceptable level of  $1 \times 10^{-5}$  for cumulative carcinogenic risk. No cancer risk estimates for individual COPCs exceed  $1 \times 10^{-6}$ .

The cumulative RME and CT HIs for the trench worker are estimated to be 0.1 and 0.04, respectively. The RME and CT HI are less than the DEQ acceptable HI of 1.0. Therefore, there are no unacceptable risks predicted for trench workers at the ConocoPhillips OU.

**Summary.** Cancer risk estimates and noncancer hazard indices are acceptable for the site and trench workers at the ConocoPhillips OU.

#### ***2.5.2.4 Utility Corridor Risk and Hazard Estimates***

The exposure pathways that were quantitatively evaluated for the Utility Corridor are soil ingestion, dermal contact with soil, inhalation of particulates and VOCs, and dermal contact with groundwater. Table 24 presents the Utility Corridor OU risk and hazard summary for each exposure scenario (summed by individual exposure pathways).

**Utility Worker.** The cumulative RME and CT excess lifetime cancer risks for the site worker are estimated to be  $1 \times 10^{-6}$  and  $6 \times 10^{-7}$ , respectively. The RME and CT risk estimates are less than the OAR 340-122 acceptable level of  $1 \times 10^{-5}$  for cumulative carcinogenic risk. No cancer risk estimates for individual COPCs exceed  $1 \times 10^{-6}$ .

The cumulative RME and CT HIs for the site worker are estimated to be 0.3 and 0.07, respectively. The RME and CT HIs are less than the DEQ acceptable HI of 1.0.

**Summary.** Cancer risk estimates and noncancer hazard indices are acceptable for the utility workers in the Utility Corridor.

#### **2.5.2.5 Off-Site Workers**

Off-site samples (that is, not collected at the KMLT, ChevronTexaco, or ConocoPhillips OUs) were collected from the ChevronTexaco Asphalt property (soil samples along the utility corridor and groundwater samples along the southern and eastern borders of the ConocoPhillips OU) and from the utility corridor adjacent to the KMLT OU. No unacceptable risks or hazards were identified to potential off-site workers. In addition, outdoor air risks and hazards were acceptable at each OU.

## **2.6 Uncertainty Analysis**

It is important to fully specify the assumptions and uncertainties inherent in the risk assessment to place the risk estimates in proper perspective. For this risk assessment, the general sources of uncertainty that are addressed include:

- Data collection and evaluation;
- Exposure assessment;
- Toxicity assessment; and
- Risk characterization.

### **2.6.1 Data Collection and Evaluation**

The identification of the types and numbers of environmental samples, sampling procedures, and sample analysis each contain components that contribute to uncertainties in this risk assessment. For example, it is generally not practical to sample all locations and media at a site. Decisions were made to select a subset of the potential sampling locations and media based upon the anticipated presence of the chemical. These decisions were made with the use of historical and background information of the site and the potential contaminants' chemical and physical properties. Exposure doses for the site that are based on non-random, or hot spot, samples may be overestimated.

### **2.6.2 Exposure Assessment**

The exposure estimation methods are subject to varying degrees of uncertainty. The degree of uncertainty generally depends on the amount of site-specific data available. The following sources of uncertainty have been identified.

**Exposure Scenario Identification.** This HHRA assumes that on-site receptors are limited to site workers, trench workers, utility workers, and landscape workers. If this assumption is incorrect, future risks and hazards could be underestimated or overestimated. The baseline evaluation does not assume the benefits of the interim action controls at the site. Therefore, the baseline evaluation assumes that site workers will be exposed to surface soil (0 to 3 feet bgs) at the site full-time, 250 days per year for 25 years.

**Exposure Parameters and Assumptions.** The standard and site-specific exposure assumptions may or may not be representative of the actual exposure conditions and could underestimate or overestimate future risks and hazards. Industrial use of groundwater was identified in the RI as a reasonably likely future beneficial water use. Groundwater vapor intrusion into buildings and inhalation of volatiles and dermal contact for site workers and trench workers, respectively, were identified in the HHRA as significant exposure pathways. These exposure pathways tended to drive the risk and hazard estimates at the three OUs. Therefore, any potential use of groundwater where volatilization or dermal contact is likely should be evaluated with respect to the groundwater COPCs identified in the HHRA.

**Calculation of Exposure Point Concentrations.** The 90 percent UCL on the arithmetic mean, or the maximum detected concentration, whichever is lower, was used as the exposure point concentration (EPC) in this HHRA. Prior to the calculation of the 90 percent UCL, each data set was evaluated to determine whether the data were distributed normally or lognormally. As discussed previously, if a data set was found to be neither normal nor lognormal, the data set was evaluated using nonparametric methods. The Chebyshev Inequality Method, which is recommended by EPA, is the most conservative of the five nonparametric methods used in EPA's ProUCL software. Therefore, the use of the Chebyshev Inequality Method may overestimate actual exposure concentrations.

**Assumption of Steady-State Conditions.** The inherent assumption is that future COPC concentrations are the same as current concentrations. In general, this assumption overestimates COPC concentrations and resulting exposure intakes.

**Chemical Characterization.** The sampling strategy used in collecting the soil and groundwater samples in this HHRA was purposive rather than random. Because the potential current and future receptors are assumed to visit the entire site, not just the areas that are contaminated, the exposure point concentrations used likely overestimate potential risks and hazards.

**Modeling Procedures.** DEQ's Risk-based Decision Making guidance was used to estimate the volatilization from groundwater to indoor and outdoor air. The

assumptions used in these models introduce uncertainty to the degree that they do not reflect actual conditions. There is significant uncertainty associated with the volatilization model used to estimate indoor and outdoor air concentrations based on soil and groundwater concentrations. Areas of uncertainty include, but are not limited to:

- **COPC Concentration.** The model assumes the COPC concentrations are homogeneous over the entire area being evaluated. Since some COPC concentrations are based on the maximum detected concentration, this is a conservative assumption that is likely to significantly overestimate the amount of contamination present.
- **Building Parameters.** The model uses various building parameters as a basis for the indoor air concentrations such as building volume to area ratio (essentially the height of the building), building air exchange rate (the amount of times the air in the building is replaced per second), the foundation crack thickness, and the foundation crack fraction (that is, the fraction of the building floor that contains cracks). Many of these assumptions have a linear effect on the model output (that is, if the air exchange rate is doubled, the indoor air concentration would drop in half). The model also assumes there is no vapor barrier under the foundation and that the building is not under positive pressure. Default building parameters were used in this HHRA.
- **COPC-Specific Parameters.** The model uses various chemical parameters such as diffusion coefficients, Log  $K_{oc}$  or Log  $K_d$ , Henry's Law Constant, vapor pressure, and solubility. These values can vary considerably in the literature. Default chemical parameters included in the RBDM model were used. These COPC-specific parameters can have a significant effect on the model results and, therefore, the degree that the parameters used represent actual conditions at the site may lead to an overestimation or underestimation of actual air concentrations.

### 2.6.3 Toxicity Assessment

**Lead Evaluation.** As discussed in the Section 2.4, lead was not identified as a soil COPC at any of the Willbridge Facility sites. DEQ's RBDM guidance (DEQ 2003) states that the "potential risk to utility workers from incidental exposure to lead in groundwater is minimal," indicating that lead-based risks from exposure to groundwater need not be further evaluated in the HHRA. Based on the assumed minimal risks to utility (excavation) workers and the low dermal permeability of lead in groundwater it is unlikely that the lead groundwater concentrations would pose unacceptable risks to trench workers or utility workers.



**Total Petroleum Hydrocarbons.** TPH was not quantitatively evaluated in this HHRA. Instead, the human health risks associated with TPH were evaluated using an indicator approach. The indicators refer to single compounds within TPH known or believed to be the most toxic and which are evaluated individually. Though there is uncertainty associated with this approach, since the assessment focused on those constituents thought to be most toxic, it is unlikely that the risks and/or hazards associated with TPH were underestimated.

Risks and hazard estimates at the KMLT OU were driven by petroleum-related COPCs (benzo(a)pyrene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, naphthalene, and 2-methylnaphthalene. Aviation gasoline range hydrocarbons were detected in all eight soil samples collected at the KMLT OU hotspot study area. The aviation gas concentrations range from 16.1 to 15,100 mg/kg. For comparative purposes, the RBDM vapor intrusion into buildings RBC for gasoline is 930 mg/kg (DEQ 2003). No other COPCs were detected in the hot spot study area at significant (i.e., unacceptable risk) levels. Benzene SQLs were slightly elevated in four of the eight hot spot soil samples. TPH was not analyzed for outside of the hot spot study area at the KMLT OU.

Risk estimates at the ChevronTexaco Ethanol Area are driven by petroleum-related COPCs benzene and benzo(a)pyrene. Risks from these two COPCs at the Non-ChevronTexaco Ethanol Area are likely acceptable. The HHRA identified potentially unacceptable risks from trench worker exposure to benzo(a)pyrene at the Non-ChevronTexaco Ethanol Area; however, as discussed this risk estimate is based on the maximum detected benzo(a)pyrene concentration, which overestimates potential exposure. TPH was not analyzed for in the Non-ChevronTexaco Ethanol Area. Significant diesel range and gasoline range hydrocarbons were detected in the ChevronTexaco Ethanol Area groundwater. The maximum detected diesel and gasoline range hydrocarbons are 210,000 and 48,000 µg/L, respectively. The 90 percent UCLs for each of these two COPCs are 130,000 µg/L diesel and 25,000 µg/L gasoline. The RBDM groundwater vapor intrusion into buildings RBC for gasoline is 120,000 µg/L and the groundwater in excavation RBC (evaluating inhalation of volatiles and dermal contact with groundwater) is 3,300 µg/L. Appropriate groundwater diesel RBCs are not available in the RBDM guidance (DEQ 2003).

**Toxicity Factors.** Whether verified by consensus among EPA scientists or not, uncertainty is present in the derivation of toxicity factors, and several assumptions are necessary. The factors used in the derivation of toxicity factors that add uncertainty to the results are presented below.

- **Extrapolation from Animal Studies.** Extrapolating human health risks from animal studies is complicated by physiological and pharmacokinetic

differences. Similar toxic effects are not always observed in all species or at similar relative concentrations (when corrected for body weight). These extrapolations may overestimate or underestimate the actual chemical toxicity to humans.

- **High-Dose to Low-Dose Extrapolations.** Toxicity values are generally based on laboratory studies using high chemical exposures. Dose-response trends observed at high doses are generally assumed to be linear at low doses. Because dose-response relationships at low doses are largely unknown, assuming a linear relationship may overestimate or underestimate chemical toxicity at concentrations in the extrapolated range.
- **Population Variability.** Laboratory animal studies generally use animal strains that are genetically similar, yet the human population is genetically diverse. Because methods for estimating toxicity in more susceptible individuals, such as children, are largely undeveloped, such estimates may overestimate or underestimate chemical toxicity.
- **Available Studies.** Not all toxicity values are based on the same amount or quality of research. As new studies are performed and reviewed, toxicity values can change. The less information available on a chemical, the greater the possibility that chemical toxicity will be overestimated or underestimated.

The uncertainties discussed above are addressed when developing RfDs by dividing the no observable adverse effect level (NOAEL) from animal studies by uncertainty factors of up to 10,000.

Uncertainty associated with determining chemical carcinogenicity is reflected in the weight-of-evidence classification groups assigned to carcinogens. In addition, uncertainties are introduced because SFs are derived from the low-dose end of the dose-response curves, and the experimental studies are usually conducted at the high-dose end of the curve. The selected 95 percent UCL of the slope of the dose-response curve is considered an upper-bound toxicity value. Therefore, it is unlikely the SFs will underestimate risk. Actual cancer risk may range from a low of zero to the upper limit defined by the model.

Uncertainty is also associated with using oral toxicity factors to evaluate dermal exposures. The use of oral toxicity factors as surrogates is necessary because there are no dermal toxicity factors approved by the EPA. Most of the uncertainty exists because it is not known whether the compounds in question exhibit the same toxicity via dermal contact as they do via the oral pathway. Default oral absorption factors were used to adjust the oral toxicity factors so that the absorbed doses calculated for the dermal pathway could be evaluated. The use of the oral absorption factors may bias the risk and hazard estimates high or low.

The use of surrogate toxicity factors for chemicals lacking toxicity factors may underestimate or overestimate the potential risks or hazards.

#### **2.6.4 Risk Characterization**

This HHRA used standard algorithms to calculate chemical intakes and associated health risks and hazards. There are certain assumptions inherent in the use of these equations that add uncertainty. For example, calculations of carcinogenic risks and non-carcinogenic HIs assume the additivity of toxic effects. This assumption adds uncertainty to the assessment and may result in an overestimation or underestimation of the potential risks, depending on whether synergistic or antagonistic conditions apply. Exposure pathway risks are combined assuming that a single receptor may be exposed to contamination through a selected number of pathways concurrently. This is a conservative estimate that may overestimate risks and hazards. Additionally, the standard algorithms used do not consider certain factors, such as absorption or matrix effects. In cases where these processes are important, the risk estimates may overestimate or underestimate the potential human risks at this site.

### **3.0 ECOLOGICAL RISK ASSESSMENT**

This presents the results of the Level I and Level II Ecological Risk Assessment (ERA) completed for the three OUs present at this site. Separate Level I Scoping ERAs were completed at each site and based on these results, it was determined that a Level II Screening ERA was only required at the KMLT OU (Figure 5), which is presented in Section 3.2. These ERAs were completed in accordance with DEQ ERA Guidance (DEQ 1998 and 2001) and the "Comment Response Document" prepared by KHM (August 15, 2002) to present the Willbridge Terminals Responsible Parties Group responses to DEQ comments on the draft Remedial Investigation Report for this site.

As discussed in the "Comment Response Document", the ERAs completed at this site were limited to upland exposure scenarios and receptors. This is consistent with the manner in which other RIs are being conducted within the Portland Harbor CERCLA Site. All issues related to in-water exposure and potential ecological risks will be evaluated during future CERCLA activities associated with the Portland Harbor Superfund Site. Transport pathways from the upland to the aquatic environment are acknowledged (Figures 7 and 8); however, no evaluation or quantification of in-water risks was performed for this ERA. The Mean (or Ordinary) High Water Mark was used to differentiate upland versus in-water portions of the Willbridge Terminal.

### **3.1 Level I Scoping Ecological Risk Assessment**

The purpose of the Level I Scoping ERA is to provide a qualitative determination of whether there is any reason to believe ecological receptors and/or exposure pathways are present or potentially present at or in the locality of the facility (LOF). The outline for the Level I Deliverable (Ecological Risk Assessment Guidance; Attachment 3, DEQ, 1998) was followed for presenting the results of the Level I evaluation in this section. The existing data summary and the results of the land and water use survey are presented in earlier sections of this RI Report. Attachment E presents photographs taken at the Willbridge Terminal during the site visit, which consist of the ConocoPhillips, ChevronTexaco, and KMLT OUs, during the site visit. Attachment F presents the DEQ Level I Ecological Scoping Checklists for each OU.

#### **3.1.1 Sensitive Environments**

The Willbridge Terminal is situated on the west bank of the Willamette River and is comprised of the Phillips Portland Terminal at 5528 NW Doane Avenue, the ChevronTexaco Willbridge Light Products Terminal at 5531 NW Doane Avenue, and the KMLT Willbridge Terminal at 5880 NW St. Helens Road (Figure 1). The site is located in Sections 18 and 19 of Range 1E, Township 1N, and in Section 13 of Range 1W, Township 1N. The Willbridge terminals are in a heavily industrialized area bordered by the Willamette River to the east and the Tualatin Mountains to the west (Figures 2 and 3). The site is zoned River Industrial by the City of Portland. Forest Park, the largest park in Portland (approximately 4,500 acres), is located in the hills above the Willbridge Terminal to the west (Figure 1).

The site is located in the Willamette River Basin. The Willamette and Columbia Rivers are migratory routes for several species of anadromous fish. Chinook, coho salmon, steelhead, and American shad are the most common migratory fish in the Willamette and Columbia Rivers. As of 1981, 32 wetlands have been identified along the Multnomah Channel, Willamette River, and Columbia River less than 15 miles downstream of the site. Groundwater flow is in the direction of the Willamette River. There are no designated wetlands within the LOF, based on the National Wetland Inventory and Metro maps. As defined by Oregon Administrative Rule (OAR) 340-122-0115 (50), "sensitive environments" within the LOF include suspected freshwater wetlands, Saltzman Creek, and the Willamette River.

### 3.1.2 Threatened and Endangered Species

The Oregon Natural Heritage Program (ONHP), which monitors rare, threatened and endangered (RTE) plants and wildlife, conducted a data search of RTE species within a 2-mile radius of the site. A letter from the ONHP is included in Attachment G. The ONHP identified the historical presence of the following species:

#### Federal Species Listed as Threatened

- *Oncorhynchus mykiss* (steelhead [Lower Columbia River Evolutionarily Significant Unit (ESU) and Upper Willamette River ESU]).
- *Oncorhynchus tshawytscha* (chinook salmon [Lower Columbia River ESU and Upper Willamette River ESU]).

#### Candidate for Federal Listing as Threatened

- *Coccyzus americanus occidentalis* (western yellow-billed cuckoo) – last observed in 1985 along the Columbia River between the Willamette River and Portland International Airport.
- *Oncorhynchus kisutch* (coho salmon [Lower Columbia River ESU]).

#### Federal Species of Concern

- *Agelaius tricolor* (tricolored blackbird) – last observed in 1985, across the Willamette River near the St. John's Landfill.
- *Clemmys marmorata marmorata* (northwestern pond turtle) – T1S, R1E, Section 4.
- *Corynorhinus townsendii townsendii* (Pacific western big-eared bat) – last observed in 1928.
- *Rana aurora aurora* (northern red-legged frog) – last observed in 2000, in the hills above the site.

#### State Species Listed as Sensitive-Critical

- *Chrysemys picta* (painted turtle) – last observed in 1993 across the Willamette River at Smith and Bybee Lakes.

#### State Species Listed as Critical

- *Cimicifuga elata* (tall bugbane) – last observed in 1993 in Forest Park.

These records also included the shortface lanx and the bristly sedge. Neither of these species is listed as threatened or endangered. The shortface lanx population is likely extirpated from this area. There was no state or federal listing information for the bristly sedge, but this species was last observed in 1887 on Swan Island across the Willamette River. Because of the site's industrial nature and its lack of habitat, neither of these species is expected to use the facility. RTE species were not observed on site during our ecological scoping site visit and are not expected on the site because of the limited habitat quality present at the Willbridge Terminal.

### **3.1.3 Site Visit Summary**

This section describes the results of Hart Crowser's October 3, 2002, visit to the site to assess whether ecological receptors and/or exposure pathways are present or potentially present at or in the Willbridge Terminal. The discussion of ecological features present at the facility is based on our on-site observations, aerial photographs, and a review of the literature. Photographs taken during the site visit are provided in Attachment E. In addition, a habitat map based on our site visit has been superimposed on an aerial photograph of the Willbridge facility and is provided in Figure 9. Each OU is addressed separately in the following sections.

#### **3.1.3.1 Observed Impacts**

Impacts to the site and surrounding properties attributable to contaminated environmental media were not observed. The majority of each OU has been developed for industrial use, with the exception of Saltzman Creek on the northeast portion of the KMLT OU. Waterfront areas have been developed with piers, riprap, and gravel, with small areas of sandy beach remaining. As such, native vegetation has been replaced with buildings and pavement or non-native, invasive species such as Himalayan blackberry (*Rubus discolor*).

#### **3.1.3.2 Ecological Features**

Ecological features were assessed by evaluating the habitat within the LOF. Attachment F presents the checklists used in this evaluation.

**ConocoPhillips OU.** The ConocoPhillips OU consists of approximately 30 acres of flat terrain with limited on-site vegetation (Figures 3 and 6). The site is 100 percent ruderal, with the majority of the site paved with asphalt or gravel for industrial use. A small (less than 1 acre) sandy beach area is located in the northeast corner of the OU adjacent to the Willamette River and is sparsely landscaped with planted shrubs as part of the City of Portland's Willamette River

Greenway Overlay zone (Figure 3). Wildlife observed in the vicinity of the beach included mallard ducks and seagulls. With the exception of the beach area, the ConocoPhillips site provides very poor habitat quality and extremely limited potential for exposure to terrestrial ecological receptors (Photographs 1 through 7; Attachment E).

**ChevronTexaco OU.** The ChevronTexaco OU consists of approximately 16 acres of flat terrain with limited on-site vegetation (Figures 3 and 4). The site is 100 percent ruderal, with the majority of the site paved with asphalt or gravel for industrial use. Unlike the ConocoPhillips OU to the southeast, the waterfront area of the ChevronTexaco OU consists of riprap and gravel with sparse landscaping in the form of planted shrubs. The ChevronTexaco OU provides very poor habitat quality and extremely limited potential for exposure to terrestrial ecological receptors (Photographs 8 through 11; Attachment E).

**KMLT OU.** The KMLT OU consists of approximately 37 acres of flat terrain with some on-site vegetation (Figures 3 and 5). The site is approximately 85 percent ruderal, with the majority of the site paved with asphalt or gravel for industrial use. Approximately 15 percent of the site towards the north end west of the beach consists of patchy scrub-shrub vegetation, such as Scotch broom (*Cytisus scoparius*) and hardhack (*Spiraea douglasii* ssp. *Douglasii*) (Figures 3 and 9). Evidence of wildlife included mammal tracks on the beach.

Saltzman Creek empties into the Willamette River on the north end of the KMLT OU (Figure 3). The creek flows beneath the industrial portion of the site in a concrete-lined canal and collects treated surface runoff, but is a natural flowing stream above and below the OU. Depending on tidal height, Saltzman Creek is approximately 1 to 3 feet deep and has a sandy bottom at its confluence with the Willamette River. Emergent riparian vegetation such as rushes (*Juncus* spp.) and willows (*Salix* spp.) are found on the moderately sloped south bank of the creek, whereas the north bank is steep and covered with blackberry (Figures 3 and 9).

A small (less than 1 acre) potential wetland was observed on a topographic bench between the sandy beach and the upland scrub-shrub slope dominated by non-native, invasive species (Figure 3). The area is suspected to be wetland based on evidence of shallow (less than 2 inches above ground surface) standing water and dominant wetland vegetation, including cattail (*Typha latifolia*), reed canarygrass (*Phalaris arundinacea*), horsetail (*Equisetum* spp.), rushes, willows, and hardhack. The eastern portion of the site near the Willamette River provides terrestrial and aquatic habitat and potential for exposure to ecological receptors (Photographs 12 through 21; Attachment E).

### **3.1.3.3 Ecologically Important Species and Habitats**

Ecologically important terrestrial species, including threatened or endangered animals were not observed on or adjacent to the site. The Willamette River is adjacent to the Willbridge Terminals and provides habitat for threatened chinook salmon and steelhead. Because Saltzman Creek is directly connected to the Willamette River, it provides potential habitat for threatened salmonids.

### **3.1.3.4 Other Wildlife Uses in Vicinity of Willbridge Facility**

As discussed previously, while there is only limited quality terrestrial habitat at the Willbridge facility, Forest Park (which includes the Tualatin Mountains), is located in the hills above the Willbridge Terminal to the west (Figure 1). The Tualatin Mountains adjoining the site to the southwest are dominated by second growth forest. Such forests are characterized by Douglas fir, western hemlock, as well as deciduous trees such as big leaf maple, vine maple, alder, Oregon ash, cottonwood, and cascara. Common understory shrubs in this area include salal, Oregon grape, devil's club, salmonberry, as well as invasive non-native plant species including Himalayan blackberry and Scot's Broom (Hulse 2002, and City of Portland, 2000).

In addition to the wildlife observed at the Willbridge Terminal during the site visit (see discussion above) other avian and mammalian species that may be encountered in the area adjacent to the site include Great horned and other owl species, swallows, nuthatches, wrens, song sparrows, thrushes, squirrels, raccoons, coyotes, skunks, and various species of mice, voles, and shrews (City of Portland, 2000). The DEQ stated in their comments on the Draft RI for the Willbridge Terminal to KHM (Letter dated March 8, 2002) that during a site visit conducted by DEQ personnel in September 2001, they observed a family of nutria, tracks of various species of burrowing mammals, tracks and fecal signs of various species of birds, as well as invertebrate species in upland terrestrial environments adjacent to the Willamette River.

While quality terrestrial habitat and terrestrial species are present in the Tualatin Mountains west of the site, access to the Willbridge Terminal is largely blocked by Highway 30, a four to five-lane roadway (City of Portland, 2000). Additionally, while an area of disturbed beach habitat was observed on the northeastern portion of the ConocoPhillips OU, access to this area is restricted by the industrial nature of the majority of the OU (Figure 9). The only wildlife observed during the site visit by Hart Crowser were transient birds such as the mallard duck and seagulls which did not appear to be feeding or nesting on this OU.



### **3.1.4 Exposure Pathways**

A general evaluation of potential receptor-pathway interactions is provided in the checklists presented in Attachment F and is presented in the Ecological CSM on Figures 7 and 8. The Ecological CSM was provided to DEQ for review and approval as part of KHM's Comment Response Document dated August 15, 2002. As summarized on the checklists provided in Attachment F, COIs are currently present in groundwater, sediments, and soils within the Willbridge Terminal.

#### **3.1.4.1 Soils**

Exposure pathways are present for contaminants in surface soils to reach terrestrial receptors only at the KMLT OU. COIs potentially present in soils include PAHs. Terrestrial receptors have the potential for exposure to contaminants in soils through direct contact, grubbing for food, and ingestion of prey containing COIs.

#### **3.1.4.2 Groundwater**

Exposure pathways are present for contaminants in groundwater to reach terrestrial and aquatic receptors at all three OUs. COIs potentially present in groundwater include metals, VOCs, SVOCs (including PAHs) and pesticides. Because of the discharge of these contaminants into groundwater, terrestrial and aquatic receptors have the potential for exposure as contaminants migrate into surface waters and potentially partition to sediments. Surface water bodies that may receive groundwater discharges include Saltzman Creek and the Willamette River. Exposure to surface water and sediments was not evaluated in this ERA.

#### **3.1.4.3 Sediments**

Exposure pathways are present for contaminants in sediments to reach terrestrial and aquatic receptors at all three OUs. COIs potentially present in sediments include BTEX, PAHs, metals, and pesticides. Aquatic receptors have the potential for exposure to contaminants in sediments through direct contact, osmotic exchange, respiration or ventilation of sediment pore waters, or regular or incidental ingestion of sediment while foraging. Terrestrial receptors have the potential for exposure to contaminants in sediments during low tide cycles through direct contact, incidental ingestion, and ingestion of prey that have taken up COIs from sediment. Exposure to sediments was not evaluated in this ERA.

### **3.1.5 Conclusions and Recommendations**

In October 2002, Hart Crowser completed a Level I Scoping ERA for possible ecological receptors and pathways at the Willbridge Terminal site. The site visit and historical research identified ecologically important species or habitats present only on a small portion of the site (the KMLT OU by Saltzman Creek, see Figure 9), within and adjacent to the Willamette River. The majority of the site is paved or covered by industrial facilities. As discussed previously, in-water exposure pathways and risks were not evaluated in this ERA.

It is concluded that a Level II Screening ERA should be conducted to further assess the potential for adverse ecological impacts to terrestrial ecological receptors at the KMLT OU where potential exposure to surface and subsurface soils (to a depth of 3 feet below ground surface) are possible. No other potentially complete exposure pathways to ecological receptors were identified for the other OUs at the Willbridge Terminal.

## **3.2 Level II screening Ecological Risk assessment**

A level II Screening ERA was conducted on the Willbridge Terminal in accordance with DEQ's guidance (DEQ, 2001). The Level II Screening ERA builds upon the information gathered during the Level I Scoping ERA and the Ecological CSM that was prepared from this information. The Level II ERA initiates the problem formulation step of the Baseline ERA process by reviewing the exposure pathways and receptors present on the site (Figures 7 and 8 and discussion in Section 4 above), identifying candidate assessment endpoints for the baseline ERA, identifying COI concentrations for use in ecological risk screening (e.g., exposure point concentrations), and identifying contaminants of potential ecological concern (CPECs) for each environmental media of concern at this site.

### **3.2.1 Exposure Pathway and Receptor Summary**

The Level I Scoping ERA was completed for each OU present at the Willbridge Terminal. The Level I ERA concluded the only potentially complete exposure pathways to terrestrial receptors for the purpose of this ERA were direct contact and incidental ingestion exposures to surface and subsurface soils in the KMLT OU in the vicinity of Saltzman Creek.

### **3.2.2 Candidate Assessment Endpoints**

The following are candidate assessment endpoints proposed for the Level II Screening ERA for the KMLT OU. Assessment endpoints establish the direction

and boundaries of the ERA and are explicit expressions of the environmental values to be protected. Assessment endpoints also assist in identifying the measurable attributes to be quantified in the ERA.

1. Survival and reproductive success of terrestrial primary producer populations (terrestrial vegetation).
2. Survival and reproductive success of populations of avian terrestrial secondary consumers (resident and migratory herbivorous and insectivorous birds).
3. Survival and reproductive success of populations of mammalian terrestrial secondary consumers (resident carnivorous and omnivorous mammals).
4. Survival and reproductive success of terrestrial invertebrate populations.

### **3.2.3 Candidate Measurement Endpoints**

Measurement endpoints are measurable responses related to the valued characteristics selected as assessment endpoints. Measurement endpoints are used to approximate, represent, or lead to assessment endpoints when assessment endpoints cannot be directly measured. The candidate measurement endpoints for each group of assessment endpoints identified above and proposed for the Level II ERA at the KMLT OU are:

- Compare media concentrations with appropriate phytotoxicity Screening level values (SLVs).
- Compare Soil Exposure Point Concentrations (EPCs) to mammalian SLVs.
- Compare Soil EPCs to avian SLVs.
- Compare Soil EPCs to invertebrate SLVs.

### **3.2.4 Calculation of COI Concentrations**

Because ecological receptors do not experience their environment on a “point” basis, it is necessary to convert measured data from single sample points into an estimate of concentrations over some relevant spatial area for conducting an appropriate risk screening for adverse ecological effects.

However, the area in the KMLT OU that has been identified as having the potential for surface and subsurface soil exposure is limited to a small area, as shown by the habitat map on Figure 9. There were only five soil samples collected from the area where there is the potential for terrestrial receptors to

contact surface soil (GATX-SS-13, GATX-SS-14, GATX-RF-2, GATX-RF-3, and GATX-RF-4) (Figure 5). These soil samples include analytical data for surface soils and subsurface soils to a depth of 3 feet below ground surface to evaluate potential impacts to burrowing mammals. A statistical summary of analytical data from these samples is presented on Table 25.

Because of the limited dataset available for assessing terrestrial wildlife exposure to surface soils at the KMLT OU, rather than calculating EPCs for mobile wildlife receptors, the maximum detected concentration of each COI was compared against the appropriate SLVs identified as measurement endpoints in Section 5.3. This screening is presented in Table 26.

### 3.2.5 Risk Screening Results

The maximum detected concentration of each PAH in soil was used as the EPC and compared against DEQ Level II SLVs as presented in DEQ's Ecological Risk Assessment Guidance (DEQ, 2001). The Level I Scoping ERA completed for this facility identified exposure pathways to RTE species as only being present in the in-water portions of the LOF; therefore, the risk screening of soils used five times the SLV to identify CPECs for the KMLT OU. The potential in-water exposure pathways were not evaluated in this ERA.

#### KMLT OU Soils

The results of the ecological risk-based screening for appropriate KMLT OU soils data are presented in Table 26. The only other CPECs identified were because SLVs were lacking for that specific COI and endpoint.

**Plant Soil CPECs (No Plant Soil SLVs Available for COI):** Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, indeno(1,2,3-cd)pyrene, and pyrene.

**Invertebrate Soil CPECs (No Invertebrate Soil SLVs Available for COI):** Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, indeno(1,2,3-cd)pyrene, and pyrene.

**Bird Soil CPECs (No Bird Soil SLVs Available for COI):** Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, indeno(1,2,3-cd)pyrene, and pyrene

**Mammalian Soil CPECs (No Mammalian Soil SLVs Available for COI):**

Benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, indeno(1,2,3-cd)pyrene, and pyrene

There were no detected concentrations of COIs that exceeded any of the available SLVs for soil. Benzo(a)pyrene was identified as a Multiple CEPC based on the fact that the calculated  $T_{ij}/T_j$  ratio was greater than the  $1/N_{ij}$  ratio as specified in the Level II ERA Guidance (DEQ, 2001). However, this CPEC selection was an anomaly result based on the fact that while there were eight COIs detected in surface soil, SLVs were only available for two of the COIs which were detected several orders of magnitude below their corresponding SLVs. Benzo(a)pyrene was detected at a concentration of 0.12 mg/kg and the corresponding Mammal SLV is 625 mg/kg. The detected concentration is so much lower than the corresponding SLV that benzo(a)pyrene is not considered a CPEC for mammalian endpoints this ERA.

**3.2.6 Uncertainty Analysis**

There was only one OU (KMLT OU) that was found to have any potential exposure pathways to terrestrial ecological receptors. Based on the measurement endpoints identified for the Level II Screening ERA, several PAHs were identified as CPECs in soil based on the lack of SLVs for that specific COI and endpoint. However, the lack of SLVs does not indicate that potential unacceptable ecological risks are present or likely at this OU.

The COIs that were detected in soils were all PAHs. While compound-specific SLVs were not available for individual PAHs, plant, invertebrate, and mammalian SLVs are available for at least one PAH each. These SLVs (using a Q factor of 5: DEQ, 2001) range from 500 mg/kg in soil (naphthalene for plants) to 19,500 mg/kg in soil (naphthalene for mammals). The detected concentrations of PAHs in surface and subsurface soils (to a depth of 3 feet) at the KMLT OU were all less than 0.2 mg/kg in soil; several orders of magnitude less than the most conservative available SLV (Table 25). Therefore, it is concluded, that the low level detections of PAHs in the soils at the KMLT OU that is available for terrestrial wildlife exposure does not present an unacceptable risk to these receptors. No additional ecological risk assessment activities are warranted for the upland portion of this facility based on exposures to terrestrial wildlife receptors.

**3.2.7 Ecological Risk Assessment Conclusions**

A Level I and a Level II ERA were completed at the Willbridge Terminal to evaluate potential risk upland (terrestrial) ecological receptors. The Level I ERA results were used to develop an ecological exposure pathway CSM that is

presented in Figures 7 and 8. There was only one OU that was found to contain any potential exposure pathways to terrestrial ecological receptors and a Level II Screening ERA was conducted to evaluate potential ecological risks from exposure to appropriate upland areas identified in the KMLT OU.

Assessment and measurement endpoints were selected and presented for the KMLT OU and a Level II Screening ERA was completed on the KMLT soils data. None of the PAHs detected in soil were found at concentrations exceeding the corresponding ecological SLV for any of the endpoints identified. The only CPECs that were identified were based on a lack of a SLV for that particular COI in soils. However, as discussed in the uncertainty section of the ERA, all detected concentrations of PAHs were several orders of magnitude less than the most conservative available SLV for PAHs in soils. Therefore, it is concluded, that the low level detections of PAHs in the soils at the KMLT OU that is available for terrestrial wildlife exposure does not present an unacceptable risk to these receptors. No additional ecological risk assessment activities are warranted for the upland portion of this facility based on exposures to terrestrial wildlife receptors.

## **4.0 RISK ASSESSMENT CONCLUSIONS**

The following sections summarize the conclusions of the baseline HHRA and ERA completed for the Willbridge Terminal Site.

### **4.1 Human Health Risk Assessment Summary**

An HHRA was completed at the Willbridge Terminal to evaluate potential risks and hazards to current and future receptors. Current and future land use at the Willbridge Terminal is industrial; therefore, the HHRA evaluated site workers, trench workers, utility workers, and landscape workers. Carcinogenic risks and noncarcinogenic hazards exceeded DEQ acceptable levels at the KMLT OU, while carcinogenic risks exceeded DEQ acceptable levels at the ChevronTexaco OU. Carcinogenic risks and noncarcinogenic hazards were acceptable at the ConocoPhillips OU, the utility corridor, and for off-site, adjacent properties.

**KMLT OU.** Elevated cancer risk estimates for the site worker are driven by benzo(a)pyrene and arsenic at the KMLT OU. The maximum detected arsenic surface soil concentration slightly exceeds, while the average arsenic concentration in surface soil at the KMLT OU is less than, the State of Washington arsenic background level. Therefore, risks associated with arsenic detections in surface soil are likely related to ambient levels of arsenic.

Benzo(a)pyrene, a petroleum-related COPC, was detected in 11 of 29 surface soil samples at the KMLT OU.

The elevated noncarcinogenic hazard estimates for the trench worker are driven by VOC detections in MW-11, which was only sampled in December 1998. 1,2,4-Trimethylbenzene, the primary COPC for the trench worker scenario, was not detected in any other KMLT OU groundwater sample. The noncarcinogenic hazard estimates indicate that, with the possible exception of the groundwater near MW-11, trench worker exposure at the KMLT OU is acceptable.

Aviation gasoline was detected at concentrations that exceed proposed RBDM gasoline RBCs at the KMLT OU hotspot area. These gasoline detections were qualitatively evaluated in the HHRA and quantitatively evaluated using indicator COPCs (i.e., VOCs, PAHs, metals).

**ChevronTexaco OU.** The cancer risk estimates for both the site worker and trench worker at the ChevronTexaco OU are driven by high benzene detections in groundwater at the ChevronTexaco Ethanol Area. This subarea is currently undergoing subsurface soil remediation and also has very high levels of GRO and DRO in site groundwater. Risks to the site worker, both total and by individual COPC, are acceptable at the Non-ChevronTexaco Ethanol area. The benzene risks at the ChevronTexaco Ethanol Area are greater than the DEQ acceptable level for individual COPCs.

Cumulative carcinogenic risk to trench worker are acceptable over the entire site and at the Non-ChevronTexaco Ethanol Area. Cumulative carcinogenic risk to trench worker slightly exceed DEQ acceptable risk levels at the ChevronTexaco Ethanol Areas. Benzene risks are acceptable at the Non-ChevronTexaco Ethanol Area and unacceptable (i.e., greater than  $1 \times 10^{-6}$ ) at the ChevronTexaco Ethanol Area. The risks from benzo(a)pyrene are unacceptable at both subareas; however the Non-ChevronTexaco Ethanol benzo(a)pyrene groundwater EPC is the maximum detected concentration that likely overestimates risks to trench workers.

Significant gasoline range hydrocarbons were detected in the ChevronTexaco Ethanol Area groundwater at concentrations that exceed proposed RBDM gasoline RBCs. Additionally, diesel range hydrocarbons were detected in groundwater at concentrations up to 210,000 µg/L; however, appropriate groundwater diesel RBCs are not available in the RBDM guidance (DEQ 2003).

**Utility Corridor, Landscape Worker, and Off-Site workers.** Risks and hazards associated with these subareas and receptors are acceptable. No individual or total risk or hazard estimates exceeded DEQ criteria.

## **4.2 Ecological Risk Assessment Summary**

A Level I and Level II ERA was completed at the Willbridge Terminal to evaluate potential risk upland (terrestrial) ecological receptors. The Level I ERA results were used to develop an ecological exposure pathway CSM that is presented in Figures 7 and 8. There was only one OU that was found to contain any potential exposure pathways to terrestrial ecological receptors and a Level II Screening ERA was conducted to evaluate potential ecological risks from exposure to appropriate upland areas identified in the KMLT OU.

Assessment and measurement endpoints were selected and presented for the KMLT OU and a Level II Screening ERA was completed on the KMLT soils data. None of the PAHs that were detected in soil were found at concentrations exceeding the corresponding ecological SLV for any of the endpoints identified. The only CPECs identified were based on a lack of a SLV for that particular COI in soils. However, as discussed in the uncertainty section of the ERA, all detected concentrations of PAHs were several orders of magnitude less than the most conservative available SLV for PAHs in soils. Therefore, it is concluded, that the low level detections of PAHs in the soils at the KMLT OU available for terrestrial wildlife exposure do not present an unacceptable risk to these receptors. No additional ecological risk assessment activities are warranted for the upland portion of this facility based on exposures to terrestrial wildlife receptors.

## **5.0 LIMITATIONS**

Hart Crowser performed this work in accordance with generally accepted professional practices related to the nature of the work accomplished, in the same or similar localities, at the time the services were performed. This report is for the specific application to the referenced project and for the exclusive use of the Willbridge Terminal Group. No other warranty, express or implied, is made.

## **6.0 REFERENCES**

City of Portland, 2000. Willamette River Inventory: Natural Resources. Public Review Draft; August 2000. City of Portland Bureau of Planning.

DEQ, 1998. Guidance for Ecological Risk Assessment: Level I Scoping, Final. November 1998.

DEQ, 2000. Guidance for Conduct of Deterministic Human Health Risk Assessments, Final. December, 1998. Updated May 2000.



DEQ, 2001. Guidance for Ecological Risk assessment, Level II Screening Benchmark Values. Corrected March 2001.

DEQ, 2002. Willbridge Bulk Fuel Facilities; DEQ Comments on the Draft Remedial Investigation Report. March 8, 2002.

DEQ, 2003. Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites. Public Comment Draft. Revised April 9, 2003.

Ecology 1994. Natural Background Soil Metals Concentrations in Washington State. Publication No. 94-114. October 1994.

EPA, 1989. Risk Assessment Guidance for Superfund: Volume I Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002.

EPA, 1992. Supplemental guidance to RAGS: Calculating the Concentration Term, Intermittent Bulletin, Volume 1, Number 1, Publication 9285.7-080, May 1992.

EPA, 1996. Soil Screening Guidance: Technical Background Document. EPA/540/R-95/128. May 1996.

EPA, 1997a. Health Effects Assessments Summary Tables, Annual FY 1997.

EPA, 1997b. Technology Support Center Issue: The Lognormal Distribution in Environmental Applications. EPA/600/R-97/006. December 1997.

EPA, 1998. Interim Final Guidance: Developing Risk-Based Cleanup Levels at Resource Conservation and Recovery Act Sites in Region 10. January 5, 1998.

EPA, 2001. Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Interim. Review Draft - For Public Comment. EPA/540/R/99/005. September 2001.

EPA, 2002a. Region 9 Preliminary Remediation Goals (PRGs) 2002. October 1, 2000.

EPA, 2002b. Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. Office of Emergency and Remedial Response. OSWER 9285.6-10. December 2002.

EPA, 2003a. Integration Risk Information System (IRIS). On-line Database.

EPA, 2003b. ProUCL User's Guide. Version 2.1.

[www.epa.gov/nerlesd1/tsc/images/pro-ucl-ug.pdf](http://www.epa.gov/nerlesd1/tsc/images/pro-ucl-ug.pdf). February 2003.

Gilbert, R.O., 1987. Statistical Methods for Environmental Pollution Monitoring. Pacific Northwest Laboratory. Van Nostrand Reinhold. New York.

Hulse, D., S. Gregory, and J. Baker, 2002. Willamette River Basin Planning Atlas; Trajectories for Environmental and Ecological Change. Oregon State University Press, Corvallis, Oregon.

## **TABLES**

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Table 1 - KMLT COPC Identification Table  
Willbridge Terminal Risk Assessment  
Portland, Oregon

	Soil (Concentrations in mg/kg)						Groundwater (Concentrations in µg/L)						Multiple Media	
	PRG	Cij	Rij	COPC?	Rij/Rj	COPC?	PRG	Cij	Rij	COPC?	Rij/Rj	COPC?	Srij	COPC?
Total Petroleum Hydrocarbons	NA	1.5E+04	--	--	--	Yes <sup>1</sup>	NA	--	--	--	--	--	--	Yes <sup>1</sup>
Aviation gas range														
Volatiles														
1,2,4-Trimethylbenzene	1.7E+02	7.1E-01	4.2E-03	No	7.8E-05	No	1.2E+01	1.4E+03	1.1E+02	Yes	5.1E-03	No	1.1E+02	Yes
1,3,5-Trimethylbenzene	7.0E+01	5.8E-01	8.3E-03	No	1.5E-04	No	1.2E+01	3.3E+02	2.7E+01	Yes	1.2E-03	No	2.7E+01	Yes
Benzene	1.3E+00	--	--	--	--	--	3.4E-01	6.2E+03	1.8E+04	Yes	8.2E-01	Yes	1.8E+04	Yes
Chloroform	1.2E+01	--	--	--	--	--	6.2E+00	6.8E+00	1.1E+00	Yes	4.9E-05	No	1.1E+00	Yes
Ethylbenzene	2.3E+02	7.9E+00	3.4E-02	No	6.4E-04	No	1.3E+03	4.9E+03	3.8E+00	Yes	1.7E-04	No	3.8E+00	Yes
Isopropylbenzene	2.0E+03	1.9E-01	9.4E-05	No	1.7E-06	No	6.6E+02	1.4E+01	2.1E-02	No	9.4E-07	No	2.1E-02	No
n-butylbenzene	2.4E+02	8.5E-01	3.5E-03	No	6.6E-05	No	2.4E+02	4.4E+00	1.9E-02	No	8.3E-07	No	2.2E-02	No
n-propylbenzene	2.4E+02	2.1E-01	8.6E-04	No	1.6E-05	No	2.4E+02	1.6E+02	6.8E-01	No	3.1E-05	No	6.8E-01	No
p-isopropyltoluene	5.2E+02	1.3E+00	2.5E-03	No	4.6E-05	No	7.2E+02	2.0E+00	2.8E-03	No	1.3E-07	No	5.3E-03	No
sec-butylbenzene	2.2E+02	6.3E-01	2.9E-03	No	5.3E-05	No	2.4E+02	5.0E+00	2.1E-02	No	9.3E-07	No	2.4E-02	No
tert-butylbenzene	3.9E+02	1.3E-01	3.2E-04	No	6.0E-06	No	2.4E+02	--	--	--	--	--	3.2E-04	No
Toluene	5.2E+02	--	--	--	--	--	7.2E+02	2.8E+03	3.9E+00	Yes	1.8E-04	No	3.9E+00	Yes
Xylene	4.2E+02	6.3E+00	1.5E-02	No	2.8E-04	No	2.1E+02	1.5E+04	7.1E+01	Yes	3.2E-03	No	7.1E+01	Yes
Semivolatiles														
Acenaphthene	2.9E+04	--	--	--	--	--	3.7E+02	5.6E+00	1.5E-02	No	6.8E-07	No	1.5E-02	No
Acenaphthylene	2.9E+04	8.3E-02	2.9E-06	No	5.3E-08	No	3.7E+02	--	--	--	--	--	2.9E-06	No
Anthracene	1.0E+05	2.2E+01	2.2E-04	No	4.1E-08	No	1.8E+03	5.6E-01	3.1E-04	No	1.4E-08	No	5.3E-04	No
Benzo(a)anthracene	2.1E+00	1.7E+01	8.0E+00	Yes	1.5E-01	Yes	9.2E-02	--	--	--	--	--	8.0E+00	Yes
Benzo(a)pyrene	2.1E-01	8.7E+00	4.2E+01	Yes	7.8E-01	Yes	9.3E-03	--	--	--	--	--	4.2E+01	Yes
Benzo(b)fluoranthene	2.1E+00	4.5E-01	2.1E-01	No	4.0E-03	No	9.2E-02	--	--	--	--	--	2.1E-01	No
Benzo(g,h,i)perylene	2.9E+04	8.2E-01	2.8E-05	No	5.3E-07	No	1.8E+02	--	--	--	--	--	2.8E-05	No
Benzo(k)fluoranthene	2.1E+01	3.4E-01	1.6E-02	No	3.0E-04	No	9.2E-01	--	--	--	--	--	1.6E-02	No
Bis(2-ethylhexyl)phthalate	1.2E+02	3.9E+00	3.2E-02	No	6.0E-04	No	4.8E+00	1.6E+01	3.3E+00	Yes	1.5E-04	No	3.3E+00	Yes
Chrysene	2.1E+02	2.5E+01	1.2E-01	No	2.2E-03	No	9.2E+00	5.8E+02	6.3E+01	Yes	2.8E-03	No	6.3E+01	Yes
Dibenz(a,h)anthracene	2.1E-01	5.8E-02	2.8E-01	No	5.1E-03	No	9.2E-03	--	--	--	--	--	2.8E-01	No
Fluoranthene	2.2E+04	6.9E-01	3.2E-05	No	5.9E-07	No	1.5E+03	1.2E+00	8.2E-04	No	3.7E-08	No	8.5E-04	No
Fluorene	2.6E+04	2.0E+01	7.8E-04	No	1.5E-05	No	2.4E+02	8.0E+00	3.3E-02	No	1.5E-06	No	3.4E-02	No
Indeno(1,2,3-cd)pyrene	2.1E+00	5.1E-01	2.4E-01	No	4.5E-03	No	9.2E-02	--	--	--	--	--	2.4E-01	No
Naphthalene	1.9E+02	1.2E+01	6.3E-02	No	1.2E-03	No	6.2E+00	5.7E+02	9.2E+01	Yes	4.1E-03	No	9.2E+01	Yes
Phenanthrene	1.0E+05	8.1E+01	8.1E-04	No	1.5E-05	No	1.8E+03	6.7E+00	4.8E-03	No	2.2E-07	No	5.6E-03	No
Pyrene	2.9E+04	3.6E+01	1.2E-03	No	2.3E-05	No	1.8E+02	2.7E+00	1.5E-02	No	6.8E-07	No	1.6E-02	No
2,4-dimethylphenol	1.2E+04	--	--	--	--	--	7.3E+02	4.1E+01	5.9E-02	No	2.5E-06	No	5.6E-02	No
2-Methylnaphthalene	1.9E+02	--	--	--	--	--	6.2E+00	1.1E+02	1.7E+01	Yes	7.8E-04	No	1.7E+01	Yes
4-methylphenol	3.1E+03	--	--	--	--	--	1.8E+02	1.7E+01	9.2E-02	No	4.1E-06	No	9.2E-02	No
Metals (total for groundwater)														
Arsenic <sup>2</sup>	7.0E+00	1.6E+01	2.3E+00	Yes	4.4E-02	Yes	4.5E-02	1.6E+02	3.6E+03	Yes	1.6E-01	Yes	3.6E+03	Yes
Barium	6.7E+04	2.5E+02	3.7E-03	No	6.9E-05	No	2.6E+03	6.7E+02	2.6E-01	No	1.2E-05	No	2.6E-01	No
Cadmium	4.5E+02	1.1E+00	2.4E-03	No	4.6E-05	No	1.8E+01	7.0E+00	3.9E-01	No	1.8E-05	No	3.9E-01	No
Chromium	4.5E+02	3.0E+01	6.8E-02	No	1.3E-03	No	1.1E+02	3.4E+01	3.1E-01	No	1.4E-05	No	3.8E-01	No
Copper	4.1E+04	4.6E+01	1.1E-03	No	2.1E-05	No	1.5E+03	1.4E+02	9.6E-02	No	4.3E-06	No	9.7E-02	No
Lead	7.5E+02	1.4E+02	1.9E-01	No	3.5E-03	No	1.5E+01	7.9E+01	5.2E+00	Yes	2.4E-04	No	5.4E+00	Yes
Mercury	3.1E+02	--	--	--	--	--	1.1E+01	8.0E-01	7.3E-02	No	3.3E-06	No	7.3E-02	No
Selenium	5.1E+03	--	--	--	--	--	1.8E+02	4.8E+00	2.7E-02	No	1.2E-06	No	2.7E-02	No
Silver	5.1E+03	--	--	--	--	--	1.8E+02	7.1E+00	3.9E-02	No	1.8E-06	No	3.9E-02	No
Zinc	1.0E+05	3.8E+02	3.9E-03	No	7.2E-05	No	1.1E+04	2.1E+02	1.9E-02	No	8.5E-07	No	2.3E-02	No
Pesticides/PCBs														
4,4'-DDD	1.0E+01	5.4E-01	5.4E-02	No	1.0E-03	No	2.8E-01	4.2E-01	--	--	--	--	5.4E-02	No
4,4'-DDE	7.0E+00	5.4E-01	7.7E-02	No	1.4E-03	No	2.0E-01	--	--	--	--	--	7.7E-02	No
4,4'-DDT	7.0E+00	2.1E+00	3.0E-01	No	5.6E-03	No	2.0E-01	--	--	--	--	--	3.0E-01	No
Rj			5.4E+01						2.2E+04					
Nij			3.6E+01						3.5E+01					
1/Nij			2.8E-02						2.9E-02					

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#### Notes:

Shading indicates analytes detected at a frequency of less than five percent.

(1) COPC identified based on the presence of TPH in site soils and groundwater. No PRG is available for screening.

(2) State of Washington natural background arsenic level (Ecology 1994).

#### Acronyms:

NA = Not Available.

ND = Not Detected.

NE = Not Evaluated (only volatile compounds evaluated).

-- = Not Applicable. Analyte not detected or detected in less than five percent of the samples.

#### Variables:

PRG = EPA Region 9 PRG (Industrial for soil, tap water for groundwater).

Cij = Maximum detected concentration of compound i in medium j.

Rij = Risk ratio for compound i in medium j (Cij/PRG); compound is a COPC if Rij is greater than 1.

Rj = Sum of risk ratios for medium j.

Nij = Number of compounds i detected in medium j.

Rij/Rj = Compound is a COPC if this ratio is greater than 1/Nij.

Srij = Summary risk ratio for compound i in all media (total Rj across all media); compound is a COPC if Srij is greater than 1.

Table 2 - ChevronTexaco COPC Identification Table  
Willbidge Terminal Risk Assessment  
Portland, Oregon

	Soil (Concentrations in mg/kg)						Groundwater (Concentrations in µg/L)						SRIj	Multiple Media COPC?	COPC?
	PRG	Cij	Rij	COPC?	Rij/Ri	COPC?	PRG	Cij	Rij	COPC?	Rij/Ri	COPC?			
<b>Total Petroleum Hydrocarbons</b>															
Gasoline	--	--	--	--	--	--	NA	4.8E+04	--	--	--	Yes <sup>1</sup>	--	--	Yes <sup>1</sup>
Diesel	--	--	--	--	--	--	NA	2.1E+05	--	--	--	Yes <sup>1</sup>	--	--	Yes <sup>1</sup>
<b>Volatiles</b>															
1,2,4-Trimethylbenzene	1.7E+02	5.3E+00	3.1E-02	No	2.5E-03	No	1.2E+01	4.8E+01	4.0E+00	Yes	9.1E-05	No	4.0E+00	Yes	Yes
1,3,5-Trimethylbenzene	7.0E+01	1.3E+00	1.9E-02	No	1.5E-03	No	1.2E+01	9.8E+00	8.1E-01	No	1.9E-05	No	8.3E-01	No	No
Benzene	1.3E+00	--	--	--	--	--	3.4E-01	1.4E+04	4.1E+04	Yes	9.4E-01	Yes	4.1E+04	Yes	Yes
Di-isopropyl ether (DIPE)	--	--	--	--	--	--	NA	1.9E+01	--	--	--	--	--	--	No
Ethylbenzene	2.3E+02	1.1E+00	4.8E-03	No	3.8E-04	No	1.3E+03	1.2E+03	9.2E-01	No	2.1E-05	No	9.3E-01	No	No
Ethyl tert-butyl ether (ETBE)	--	--	--	--	--	--	NA	--	--	--	--	--	--	--	No
Isopropylbenzene	2.0E+03	3.1E-01	1.6E-04	No	1.2E-05	No	6.6E+02	6.6E+01	1.0E-01	No	2.3E-06	No	1.0E-01	No	No
Methyl tert-butyl ether (MTBE)	6.2E+01	--	--	--	--	--	1.3E+01	3.2E+03	2.5E+02	Yes	5.6E-03	No	2.5E+02	Yes	Yes
n-butylbenzene	2.4E+02	3.2E-01	1.3E-03	No	1.1E-04	No	2.4E+02	1.8E+01	7.6E-02	No	1.7E-06	No	7.7E-02	No	No
n-propylbenzene	2.4E+02	1.1E+00	4.4E-03	No	3.5E-04	No	2.4E+02	1.1E+02	4.7E-01	No	1.1E-05	No	4.7E-01	No	No
p-isopropyltoluene	5.2E+02	1.6E-01	3.1E-04	No	2.5E-05	No	7.2E+02	--	--	--	--	--	3.1E-04	No	No
sec-butylbenzene	2.2E+02	1.5E-01	6.9E-04	No	5.5E-05	No	2.4E+02	8.8E+00	3.8E-02	No	8.3E-07	No	3.7E-02	No	No
Tert amyl-methyl ether (TAME)	--	--	--	--	--	--	NA	5.6E+01	--	--	--	--	--	--	No
tert-butyl alcohol (TBA)	--	--	--	--	--	--	NA	3.9E+03	--	--	--	--	--	--	No
Toluene	5.2E+02	5.2E-01	9.9E-04	No	7.9E-05	No	7.2E+02	6.0E+03	8.3E+00	Yes	1.9E-04	No	8.3E+00	Yes	Yes
Xylene	4.2E+02	2.5E+00	5.9E-03	No	4.7E-04	No	2.1E+02	5.5E+03	2.6E+01	Yes	6.0E-04	No	2.6E+01	Yes	Yes
<b>Semivolatiles</b>															
Acenaphthene	2.9E+04	--	--	--	--	--	3.7E+02	2.8E+01	7.5E-02	No	1.7E-06	No	7.5E-02	No	No
Acenaphthylene	2.9E+04	--	--	--	--	--	3.7E+02	4.0E-01	1.1E-03	No	2.5E-08	No	1.1E-03	No	No
Anthracene	1.0E+05	3.4E-02	3.4E-07	No	2.7E-08	No	1.8E+03	1.9E+00	1.0E-03	No	2.4E-08	No	1.0E-03	No	No
Benzo(a)anthracene	2.1E+00	1.0E+00	4.9E-01	No	3.9E-02	Yes	9.2E-02	1.4E+00	1.5E+01	Yes	3.4E-04	No	1.5E+01	Yes	Yes
Benzo(a)pyrene	2.1E-01	1.6E+00	7.5E+00	Yes	6.0E-01	Yes	9.3E-03	2.5E+00	2.7E+02	Yes	6.1E-03	No	2.7E+02	Yes	Yes
Benzo(b)fluoranthene	2.1E+00	1.9E+00	9.0E-01	No	7.1E-02	Yes	9.2E-02	3.0E+00	3.2E+01	Yes	7.4E-04	No	3.3E+01	Yes	Yes
Benzo(g,h,i)perylene	2.9E+04	1.6E+00	5.6E-05	No	4.5E-06	No	1.8E+02	2.9E+00	1.6E-02	No	3.7E-07	No	1.6E-02	No	No
Benzo(k)fluoranthene	2.1E+01	1.1E+00	5.4E-02	No	4.3E-03	No	9.2E-01	1.3E+00	1.4E+00	Yes	3.2E-05	No	1.5E+00	Yes	Yes
Bis(2-ethylhexyl)phthalate	1.2E+02	--	--	--	--	--	4.8E+00	--	--	--	--	--	--	--	No
Chrysene	2.1E+02	1.5E+00	7.3E-03	No	5.8E-04	No	9.2E+00	2.3E+00	2.5E-01	No	5.7E-06	No	2.6E-01	No	No
Dibenz(a,h)anthracene	2.1E-01	5.9E-01	2.8E+00	Yes	2.2E-01	Yes	9.2E-03	--	--	--	--	--	2.8E+00	Yes	Yes
Dibenzofuran	3.1E+03	4.0E-02	1.3E-05	No	1.0E-06	No	2.4E+01	--	--	--	--	--	1.3E-05	No	No
Fluoranthene	2.2E+04	1.9E+00	8.8E-05	No	7.0E-06	No	1.5E+03	7.3E+00	4.8E-03	No	1.1E-07	No	4.9E-03	No	No
Fluorene	2.6E+04	1.2E+01	4.4E-04	No	3.5E-05	No	2.4E+02	1.7E+02	7.2E-01	No	1.8E-05	No	7.2E-01	No	No
Indeno(1,2,3-cd)pyrene	2.1E+00	1.4E+00	6.5E-01	No	5.2E-02	Yes	9.2E-02	2.0E+00	2.1E+01	Yes	4.9E-04	No	2.2E+01	Yes	Yes
Naphthalene	1.9E+02	5.2E-01	2.8E-03	No	2.2E-04	No	6.2E+00	2.4E+02	3.9E+01	Yes	8.9E-04	No	3.9E+01	Yes	Yes
Phenanthrene	1.0E+05	1.4E+01	1.4E-04	No	1.1E-05	No	1.8E+03	2.6E+02	1.5E-01	No	3.4E-06	No	1.5E-01	No	No
Pyrene	2.9E+04	1.8E+00	6.2E-05	No	4.9E-06	No	1.8E+02	1.5E+01	8.1E-02	No	1.9E-06	No	8.1E-02	No	No
2,4-dimethylphenol	1.2E+04	--	--	--	--	--	7.3E+02	--	--	--	--	--	--	--	No
2-Methylnaphthalene	1.9E+02	--	--	--	--	--	6.2E+00	4.1E+01	6.7E+00	Yes	1.5E-04	No	6.7E+00	Yes	Yes
4-methylphenol	3.1E+03	--	--	--	--	--	1.8E+02	--	--	--	--	--	--	--	No
<b>Metals (total for groundwater)</b>															
Arsenic <sup>2</sup>	7.0E+00	5.8E+00	--	--	--	--	4.5E-02	8.3E+01	1.8E+03	Yes	4.2E-02	Yes	1.8E+03	Yes	Yes
Barium	6.7E+04	1.6E+02	2.4E-03	No	1.9E-04	No	2.6E+03	1.3E+03	5.1E-01	No	1.2E-05	No	5.1E-01	No	No
Cadmium	4.5E+02	1.2E+00	2.7E-03	No	2.1E-04	No	1.8E+01	3.6E+01	2.0E+00	Yes	4.5E-05	No	2.0E+00	Yes	Yes
Chromium	4.5E+02	2.5E+01	5.5E-02	No	4.4E-03	No	1.1E+02	2.2E+02	2.0E+00	Yes	4.5E-05	No	2.0E+00	Yes	Yes
Copper	4.1E+04	1.3E+02	3.3E-03	No	2.6E-04	No	1.5E+03	2.4E+02	1.6E-01	No	3.7E-06	No	1.6E-01	No	No
Lead	7.5E+02	2.4E+01	3.2E-02	No	2.6E-03	No	1.5E+01	1.3E+02	8.8E+00	Yes	2.0E-04	No	8.8E+00	Yes	Yes
Mercury	3.1E+02	6.9E-02	2.2E-04	No	1.8E-05	No	1.1E+01	1.8E+00	1.6E-01	No	3.7E-06	No	1.6E-01	No	No
Selenium	5.1E+03	8.9E-01	1.7E-04	No	1.4E-05	No	1.8E+02	4.5E+00	2.5E-02	No	5.7E-07	No	2.5E-02	No	No
Silver	5.1E+03	--	--	--	--	--	1.8E+02	5.0E+00	2.8E-02	No	6.4E-07	No	2.8E-02	No	No
Zinc	1.0E+05	2.4E+02	2.4E-03	No	1.9E-04	No	1.1E+04	4.3E+02	3.9E-02	No	8.9E-07	No	4.1E-02	No	No
Rj			1.3E+01						4.4E+04						
Nij			3.8E+01						3.6E+01						
1/Nij			2.6E-02						2.8E-02						

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#### Notes:

Shading indicates analytes detected at a frequency of less than five percent.

(1) COPC identified based on the presence of TPH in site soils and groundwater. No PRG is available for screening.

(2) State of Washington natural background arsenic level (Ecology 1994).

#### Acronyms:

NA = Not Available.

ND = Not Detected.

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-- = Not Applicable. Analyte not detected or detected in less than five percent of the samples.

#### Variables:

PRG = EPA Region 9 PRG (residential for soil, tap water for groundwater).

Cij = Maximum detected concentration of compound i in medium j.

Rij = Risk ratio for compound i in medium j (Cij/PRG); compound is a COPC if Rij is greater than 1.

Ri = Sum of risk ratios for medium j.

Nij = Number of compounds i detected in medium j.

Rij/Ri = Compound is a COPC if this ratio is greater than 1/Nij.

SRIj = Summary risk ratio for compound i in all media (total Rij across all media); compound is a COPC if SRIj is greater than 1.

**Table 3 - ConocoPhillips COPC Identification Table**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

	Soil (Concentrations in mg/kg)						Groundwater (Concentrations in µg/L)						Multiple Media		COPC?
	PRG	Cij	Rij	COPC?	Rij/Rj	COPC?	PRG	Cij	Rij	COPC?	Rij/Rj	COPC?	SRij	COPC?	
<b>Total Petroleum Hydrocarbons</b>															
Gasoline range	NA	5.6E+00	--	--	--	Yes <sup>1</sup>	--	--	--	--	--	--	--	--	Yes <sup>1</sup>
<b>Volatiles</b>															
1,2,4-Trimethylbenzene	1.7E+02	--	--	--	--	--	1.2E+01	6.5E+01	5.4E+00	Yes	2.4E-04	No	5.4E+00	Yes	Yes
1,3,5-Trimethylbenzene	7.0E+01	--	--	--	--	--	1.2E+01	3.6E+01	3.0E+00	Yes	1.3E-04	No	3.0E+00	Yes	Yes
Benzene	1.3E+00	3.9E-01	3.0E-01	No	1.0E-01	Yes	3.4E+01	7.1E+02	2.1E+03	Yes	9.3E-02	Yes	2.1E+03	Yes	Yes
Ethylbenzene	2.3E+02	3.2E-01	1.4E-03	No	4.6E-04	No	1.3E+03	9.9E+02	7.6E-01	No	3.4E-05	No	7.6E-01	No	No
Isopropylbenzene	2.0E+03	--	--	--	--	--	6.6E+02	2.0E+02	3.0E-01	No	1.4E-05	No	3.0E-01	No	No
n-butylbenzene	2.4E+02	--	--	--	--	--	2.4E+02	4.1E+01	1.7E-01	No	7.5E-06	No	1.7E-01	No	No
n-propylbenzene	2.4E+02	--	--	--	--	--	2.4E+02	2.5E+02	1.0E+00	Yes	4.6E-05	No	1.0E+00	Yes	Yes
p-isopropyltoluene	5.2E+02	--	--	--	--	--	7.2E+02	4.2E+00	5.9E-03	No	2.6E-07	No	5.9E-03	No	No
sec-butylbenzene	2.2E+02	--	--	--	--	--	2.4E+02	1.7E+01	6.9E-02	No	3.1E-06	No	6.9E-02	No	No
tert-butylbenzene	3.9E+02	--	--	--	--	--	2.4E+02	6.2E+00	2.6E-02	No	1.1E-06	No	2.6E-02	No	No
Toluene	5.2E+02	1.3E+00	2.5E-03	No	8.5E-04	No	7.2E+02	4.4E+01	6.2E-02	No	2.7E-06	No	6.4E-02	No	No
Xylene	4.2E+02	1.8E+00	4.3E-03	No	1.4E-03	No	2.1E+02	2.4E+02	1.1E+00	Yes	5.0E-05	No	1.1E+00	Yes	Yes
<b>Semivolatiles</b>															
Acenaphthene	2.9E+04	--	--	--	--	--	3.7E+02	9.1E+01	2.5E-01	No	1.1E-05	No	2.5E-01	No	No
Acenaphthylene	2.9E+04	--	--	--	--	--	3.7E+02	--	--	--	--	--	--	--	No
Anthracene	1.0E+05	4.0E-02	4.0E-07	No	1.3E-07	No	1.8E+03	7.1E+01	4.0E-02	No	1.8E-06	No	4.0E-02	No	No
Benzo(a)anthracene	2.1E+00	4.1E-01	1.9E-01	No	6.5E-02	Yes	9.2E-02	3.0E+01	3.2E+02	Yes	1.4E-02	No	3.2E+02	Yes	Yes
Benzo(a)pyrene	2.1E-01	3.4E-01	1.6E+00	Yes	5.4E-01	Yes	9.3E-03	--	--	--	--	--	1.6E+00	Yes	Yes
Benzo(b)fluoranthene	2.1E+00	5.9E-01	2.8E-01	No	9.5E-02	Yes	9.2E-02	3.7E+00	4.0E+01	Yes	1.8E-03	No	4.0E+01	Yes	Yes
Benzo(g,h,i)perylene	2.9E+04	2.5E-01	8.4E-06	No	2.8E-06	No	1.8E+02	--	--	--	--	--	8.4E-06	No	No
Benzo(k)fluoranthene	2.1E+01	1.6E-01	7.6E-03	No	2.6E-03	No	9.2E-01	--	--	--	--	--	7.6E-03	No	No
Chrysene	2.1E+02	3.2E-01	1.5E-03	No	5.2E-04	No	9.2E+00	1.4E+01	1.5E+00	Yes	6.5E-05	No	1.5E+00	Yes	Yes
Dibenz(a,h)anthracene	2.1E-01	8.3E-02	3.9E-01	No	1.3E-01	Yes	9.2E-03	--	--	--	--	--	3.9E-01	No	Yes
Fluoranthene	2.2E+04	4.7E-01	2.1E-05	No	7.1E-06	No	1.5E+03	1.8E+02	1.2E-01	No	5.3E-06	No	1.2E-01	No	No
Fluorene	2.6E+04	--	--	--	--	--	2.4E+02	2.4E-01	9.9E-01	No	4.4E-05	No	9.9E-01	No	No
Indeno(1,2,3-cd)pyrene	2.1E+00	1.7E-01	8.2E-02	No	2.8E-02	No	9.2E-02	--	--	--	--	--	8.2E-02	No	No
Naphthalene	1.9E+02	--	--	--	--	--	6.2E+00	9.1E+01	1.5E+01	Yes	6.6E-04	No	1.5E+01	Yes	Yes
Phenanthrene	1.0E+05	1.5E-01	1.5E-06	No	5.1E-07	No	1.8E+03	4.8E+02	2.7E-01	No	1.2E-05	No	2.7E-01	No	No
Pyrene	2.9E+04	6.2E-01	2.1E-05	No	7.1E-06	No	1.8E+02	1.2E+02	6.8E-01	No	3.0E-05	No	6.8E-01	No	No
<b>Metals (total for groundwater)</b>															
Arsenic <sup>2</sup>	7.0E+00	6.2E+00	--	--	--	--	4.5E-02	9.0E+02	2.0E+04	Yes	8.9E-01	Yes	2.0E+04	Yes	Yes
Barium	6.7E+04	9.2E+01	1.4E-03	No	4.6E-04	No	2.6E+03	3.4E+03	1.3E+00	Yes	5.8E-05	No	1.3E+00	Yes	Yes
Cadmium	4.5E+02	2.2E+00	4.8E-03	No	1.6E-03	No	1.8E+01	1.2E+01	6.4E-01	No	2.8E-05	No	6.4E-01	No	No
Chromium	4.5E+02	1.9E+01	4.2E-02	No	1.4E-02	No	1.1E+02	3.2E+02	2.9E+00	Yes	1.3E-04	No	2.9E+00	Yes	Yes
Copper	4.1E+04	8.1E+01	2.0E-03	No	6.6E-04	No	1.5E+03	4.0E+02	2.7E-01	No	1.2E-05	No	2.7E-01	No	No
Lead	7.5E+02	2.9E+01	3.9E-02	No	1.3E-02	No	1.5E+01	1.8E+02	1.2E+01	Yes	5.2E-04	No	1.2E+01	Yes	Yes
Mercury	3.1E+02	2.5E-01	8.2E-04	No	2.7E-04	No	1.1E+01	8.8E-01	8.0E-02	No	3.6E-06	No	8.1E-02	No	No
Selenium	5.1E+03	6.6E-01	1.3E-04	No	4.4E-05	No	1.8E+02	3.4E+00	1.9E-02	No	8.5E-07	No	1.9E-02	No	No
Silver	5.1E+03	--	--	--	--	--	1.8E+02	5.6E+00	3.1E-02	No	1.4E-06	No	3.1E-02	No	No
Zinc	1.0E+05	2.1E+02	2.1E-03	No	7.1E-04	No	1.1E+04	2.6E+03	2.4E-01	No	1.0E-05	No	2.4E-01	No	No
Rj			3.0E+00												
Nij			2.6E+01												
1/Nij			3.8E-02												

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**Notes:**

Shading indicates analytes detected at a frequency of less than five percent.

<sup>(1)</sup> COPC identified based on the presence of TPH in site soils and groundwater. No PRG is available for screening.

<sup>(2)</sup> State of Washington natural background arsenic level (Ecology 1994).

**Acronyms:**

NA = Not Available.

ND = Not Detected.

NE = Not Evaluated (only volatile compounds evaluated).

-- = Not Applicable. Analyte not detected or detected in less than five percent of the samples.

**Variables:**

PRG = EPA Region 9 PRG (residential for soil, tap water for groundwater).

Cij = Maximum detected concentration of compound i in medium j.

Rij = Risk ratio for compound i in medium j (Cij/PRG); compound is a COPC if Rij is greater than 1.

Rj = Sum of risk ratios for medium j.

Nij = Number of compounds i detected in medium j.

Rij/Rj = Compound is a COPC if this ratio is greater than 1/Nij.

SRij = Summary risk ratio for compound i in all media (total Rij across all media); compound is a COPC if SRij is greater than 1.

**Table 4 - Willbridge Terminal Utility Corridor COPC Identification Table**  
**Willbridge Terminal**  
**Portland, Oregon**

	Soil (Concentrations in mg/kg)						Groundwater (Concentrations in µg/L)						Multiple Media		
	PRG	Cij	Rij	COPC?	Rij/Rj	COPC?	PRG	Cij	Rij	COPC?	Rij/Rj	COPC?	SRij	COPC?	COPC?
<b>Volatiles</b>															
1,2,4-Trimethylbenzene	1.7E+02	--	--	--	--	--	1.2E+01	6.5E+01	5.4E+00	Yes	1.2E-03	No	5.4E+00	Yes	Yes
1,3,5-Trimethylbenzene	7.0E+01	--	--	--	--	--	1.2E+01	3.6E+01	3.0E+00	Yes	6.6E-04	No	3.0E+00	Yes	Yes
Benzene	1.3E+00	--	--	--	--	--	3.4E-01	6.6E+02	1.9E+03	Yes	4.2E-01	Yes	1.9E+03	Yes	Yes
Chloroform	1.2E+01	--	--	--	--	--	6.2E+00	--	--	--	--	--	--	--	No
Ethylbenzene	2.3E+02	1.3E+00	5.8E-03	No	1.8E-03	No	1.3E+03	9.9E+02	7.6E-01	No	1.7E-04	No	7.7E-01	No	No
Isopropylbenzene	2.0E+03	5.0E-01	2.5E-04	No	7.8E-05	No	6.6E+02	2.0E+02	3.0E-01	No	6.6E-05	No	3.0E-01	No	No
n-butylbenzene	2.4E+02	1.9E+00	7.8E-03	No	2.4E-03	No	2.4E+02	4.1E+01	1.7E-01	No	3.7E-05	No	1.8E-01	No	No
n-propylbenzene	2.4E+02	2.4E+00	1.0E-02	No	3.2E-03	No	2.4E+02	2.5E+02	1.0E+00	Yes	2.3E-04	No	1.1E+00	Yes	Yes
p-isopropyltoluene	5.2E+02	--	--	--	--	--	7.2E+02	4.2E+00	5.9E-03	No	1.3E-06	No	5.9E-03	No	No
sec-butylbenzene	2.2E+02	5.3E-01	2.4E-03	No	7.6E-04	No	2.4E+02	1.7E+01	6.9E-02	No	1.5E-05	No	7.2E-02	No	No
tert-butylbenzene	3.9E+02	--	--	--	--	--	2.4E+02	6.2E+00	2.6E-02	No	5.6E-06	No	2.6E-02	No	No
Toluene	5.2E+02	1.3E+00	2.4E-03	No	7.7E-04	No	7.2E+02	3.0E+01	4.1E-02	No	9.0E-06	No	4.4E-02	No	No
Xylene	4.2E+02	3.8E+00	9.0E-03	No	2.8E-03	No	2.1E+02	2.4E+02	1.1E+00	Yes	2.5E-04	No	1.1E+00	Yes	Yes
<b>Semivolatiles</b>															
Acenaphthene	2.9E+04	2.7E+00	9.1E-05	No	2.9E-05	No	3.7E+02	1.3E+01	3.6E-02	No	7.8E-06	No	3.6E-02	No	No
Acenaphthylene	2.9E+04	4.8E-02	1.6E-06	No	5.2E-07	No	3.7E+02	--	--	--	--	--	1.6E-06	No	No
Anthracene	1.0E+05	1.4E+00	1.4E-05	No	4.3E-06	No	1.8E+03	1.0E+00	5.7E-04	No	1.2E-07	No	5.8E-04	No	No
Benzo(a)anthracene	2.1E+00	3.5E-01	1.7E-01	No	5.3E-02	Yes	9.2E-02	1.3E+00	1.4E+01	Yes	3.0E-03	No	1.4E+01	Yes	Yes
Benzo(a)pyrene	2.1E-01	2.8E-01	1.3E+00	Yes	4.2E-01	Yes	9.3E-03	2.0E-01	2.2E+01	Yes	4.7E-03	No	2.3E+01	Yes	Yes
Benzo(b)fluoranthene	2.1E+00	1.7E-01	8.0E-02	No	2.5E-02	No	9.2E-02	5.5E-01	5.9E+00	Yes	1.3E-03	No	6.0E+00	Yes	Yes
Benzo(g,h,i)perylene	2.9E+04	1.5E-01	5.2E-06	No	1.6E-06	No	1.8E+02	1.0E-01	5.6E-04	No	1.2E-07	No	5.6E-04	No	No
Benzo(k)fluoranthene	2.1E+01	2.0E-01	9.5E-03	No	3.0E-03	No	9.2E-01	--	--	--	--	--	9.5E-03	No	No
Bis(2-ethylhexyl)phthalate	1.2E+02	6.0E+00	5.0E-02	No	1.6E-02	No	4.8E+00	--	--	--	--	--	5.0E-02	No	No
Chrysene	2.1E+02	8.3E-01	4.0E-03	No	1.3E-03	No	9.2E+00	1.0E+00	1.1E-01	No	2.5E-05	No	1.2E-01	No	No
Dibenz(a,h)anthracene	2.1E-01	4.5E-02	2.1E-01	No	6.7E-02	Yes	9.2E-03	--	--	--	--	--	2.1E-01	No	Yes
Fluoranthene	2.2E+04	1.9E+00	8.6E-05	No	2.7E-05	No	1.5E+03	1.6E+00	1.1E-03	No	2.3E-07	No	1.2E-03	No	No
Fluorene	2.6E+04	4.3E+00	1.7E-04	No	5.2E-05	No	2.4E+02	3.2E+01	1.3E-01	No	2.9E-05	No	1.3E-01	No	No
Indeno(1,2,3-cd)pyrene	2.1E+00	1.0E-01	4.9E-02	No	1.5E-02	No	9.2E-02	1.0E-01	1.1E+00	Yes	2.4E-04	No	1.1E+00	Yes	Yes
Naphthalene	1.9E+02	1.0E-01	5.4E-04	No	1.7E-04	No	6.2E+00	9.1E+01	1.5E+01	Yes	3.2E-03	No	1.5E+01	Yes	Yes
Phenanthrene	1.0E+05	7.8E+00	7.8E-05	No	2.5E-05	No	1.8E+03	3.9E+01	2.2E-02	No	4.7E-06	No	2.2E-02	No	No
Pyrene	2.9E+04	2.2E+00	7.5E-05	No	2.4E-05	No	1.8E+02	1.5E+01	8.1E-02	No	1.8E-05	No	8.1E-02	No	No
2-Methylnaphthalene	1.9E+02	--	--	--	--	--	6.2E+00	4.1E+01	6.7E+00	Yes	1.5E-03	No	6.7E+00	Yes	Yes
<b>Metals (total for groundwater)</b>															
Arsenic <sup>2</sup>	7.0E+00	7.9E+00	1.1E+00	Yes	3.8E-01	Yes	4.5E-02	1.2E+02	2.6E+03	Yes	5.6E-01	Yes	2.6E+03	Yes	Yes
Barium	6.7E+04	1.1E+02	1.7E-03	No	5.4E-04	No	2.6E+03	9.9E+02	3.8E-01	No	8.2E-05	No	3.8E-01	No	No
Cadmium	4.5E+02	--	--	--	--	--	1.8E+01	3.6E+01	2.0E+00	Yes	4.3E-04	No	2.0E+00	Yes	Yes
Chromium	4.5E+02	2.1E+01	4.6E-02	No	1.5E-02	No	1.1E+02	1.5E+02	1.3E+00	Yes	2.9E-04	No	1.4E+00	Yes	Yes
Copper	4.1E+04	2.9E+01	7.0E-04	No	2.2E-04	No	1.5E+03	2.4E+02	1.6E-01	No	3.5E-05	No	1.6E-01	No	No
Lead	7.5E+02	3.5E+01	4.7E-02	No	1.5E-02	No	1.5E+01	9.7E+01	6.4E+00	Yes	1.4E-03	No	6.5E+00	Yes	Yes
Mercury	3.1E+02	6.1E-02	2.0E-04	No	6.2E-05	No	1.1E+01	8.0E-01	7.3E-02	No	1.6E-05	No	7.3E-02	No	No
Selenium	5.1E+03	--	--	--	--	--	1.8E+02	3.9E+00	2.2E-02	No	4.7E-06	No	2.2E-02	No	No
Silver	5.1E+03	--	--	--	--	--	1.8E+02	7.1E+00	3.9E-02	No	8.6E-06	No	3.9E-02	No	No
Zinc	1.0E+05	7.4E+01	7.4E-04	No	2.3E-04	No	1.1E+04	4.3E+02	3.9E-02	No	8.5E-06	No	4.0E-02	No	No
<b>Pesticides/PCBs</b>															
4,4'-DDD	1.0E+01	5.8E-02	5.8E-03	No	1.8E-03	No	2.8E-01	4.2E-01	--	--	--	--	5.8E-03	No	No
RJ			3.2E+00						4.6E+03						
NIJ			3.2E+01						3.7E+01						
1/NIJ			3.1E-02						2.7E-02						

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**Notes:**

Shading indicates analytes detected at a frequency of less than five percent.

(1) COPC identified based on the presence of TPH in site soils and groundwater. No PRG is available for screening.

(2) State of Washington natural background arsenic level (Ecology 1994).

**Acronyms:**

NA = Not Available.

ND = Not Detected.

NE = Not Evaluated (only volatile compounds evaluated).

-- = Not Applicable. Analyte not detected or detected in less than five percent of the samples.

**Variables:**

PRG = EPA Region 9 PRG (residential for soil, tap water for groundwater).

Cij = Maximum detected concentration of compound i in medium j.

Rij = Risk ratio for compound i in medium j (Cij/PRG); compound is a COPC if Rij is greater than 1.

Rj = Sum of risk ratios for medium j.

NIJ = Number of compounds i detected in medium j.

Rij/Rj = Compound is a COPC if this ratio is greater than 1/NIJ.

SRij = Summary risk ratio for compound i in all media (total Rij across all media); compound is a COPC if SRij is greater than 1.

**Table 5 - KMLT Landscape Worker Data Summary: Soil**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

Analyte	Detection Frequency	SQL Range (Min-Max)	Detect Range (Min-Max)	Sample ID of Maximum Detection	EPA Region 9 Industrial Soil PRG	Maximum	Arithmetic Mean
<b>KMLT: Landscape Worker, Surface Soil (0 to 3 feet bgs)</b>							
<b>SVOCs in mg/kg</b>							
Benzo(a)anthracene	3/5	0.0067	0.0273 - 0.0872	G-RF-4(2.5)	2.1E+00	8.7E-02	3.9E-02
Benzo(a)pyrene	3/5	0.0067	0.0412 - 0.119	G-RF-4(2.5)	2.1E-01	1.2E-01	4.8E-02
Benzo(b)fluoranthene	3/5	0.0067	0.0329 - 0.124	G-RF-4(2.5)	2.1E+00	1.2E-01	4.3E-02
Benzo(g,h,i)perylene	3/5	0.0067	0.0346 - 0.0899	G-RF-4(2.5)	2.9E+04	9.0E-02	3.6E-02
Benzo(k)fluoranthene	3/5	0.0067	0.0227 - 0.0674	G-RF-4(2.5)	2.1E+01	6.7E-02	2.5E-02
Chrysene	3/5	0.0067	0.0272 - 0.107	G-RF-4(2.5)	2.1E+02	1.1E-01	4.5E-02
Indeno(1,2,3-cd)pyrene	3/5	0.0067	0.0238 - 0.0679	G-RF-4(2.5)	2.1E+00	6.8E-02	2.6E-02
Pyrene	3/5	0.0067	0.0668 - 0.191	G-RF-4(2.5)	2.9E+04	1.9E-01	7.1E-02

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**Acronyms and Abbreviations:**

SQL = Standard quantification limit.

Min = Minimum.

Max = Maximum.

PRG = EPA Region 9 PRG (industrial for soil, tap water for groundwater).

bgs = Below ground surface.



**Table 6 - ChevronTexaco Landscape Work Data Summary: Soil  
Willbridge Terminal Risk Assessment  
Portland, Oregon**

Analyte	Detection Frequency	SQL Range (Min-Max)	Detect Range (Min-Max)	Sample ID of Maximum Detection	EPA Region 9 Industrial Soil PRG	Maximum	Arithmetic Mean
<b>ChevronTexaco: Landscape Worker, Surface Soil (0 to 4 feet bgs)<sup>2</sup></b>							
<b>VOCs in mg/kg</b>							
Xylenes (total)	1/4	0.05 - 0.1	0.0552	C-RF-3(4)	4.2E+02	5.5E-02	3.9E-02
<b>SVOCs in mg/kg</b>							
Fluoranthene	1/4	0.035 - 0.67	0.113	C-SS-14	2.2E+04	1.1E-01	1.1E-01
Fluorene	1/4	0.035 - 0.67	0.425	C-RF-1(4)	2.6E+04	4.3E-01	2.0E-01
Phenanthrene	3/4	0.035	0.0585 - 4.65	C-RF-3(4)	1.0E+05	4.7E+00	1.5E+00
Pyrene	1/4	0.035 - 0.67	0.183	C-SS-14	2.9E+04	1.8E-01	1.6E-01
<b>Metals in mg/kg</b>							
Arsenic <sup>1</sup>	1/1	--	1.36	C-SS-14	7.0E+00	1.4E+00	1.4E+00
Barium	1/1	--	63.9	C-SS-14	6.7E+04	6.4E+01	6.4E+01
Cadmium	1/1	--	0.71	C-SS-14	4.5E+02	7.1E-01	7.1E-01
Chromium	1/1	--	7.57	C-SS-14	4.2E+02	7.6E+00	7.6E+00
Copper	1/1	--	7.69	C-SS-14	4.1E+04	7.7E+00	7.7E+00
Selenium	1/1	--	0.65	C-SS-14	5.1E+03	6.5E-01	6.5E-01
Zinc	1/1	--	47.1	C-SS-14	1.0E+05	4.7E+01	4.7E+01

Please refer to notes at end of table.

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**Notes:**

<sup>(1)</sup> State of Washington natural background arsenic level (Ecology 1994).

<sup>(2)</sup> Sample C-RF-3[4] was included in the Chevron Landscape Worker data set, even though it was collected at a depth of 4-feet that is deeper than the 0- to 3-foot surface soil depth interval, because of the limited number of surface soil samples that were collected in the area where landscaping will take place.

**Acronyms and Abbreviations:**

Min = Minimum.

Max = Maximum.

PRG = EPA Region 9 PRG (industrial for soil, tap water for groundwater).

**Table 7 - ChevronTexaco Asphalt Data Summary: Groundwater  
Willbridge Terminal Risk Assessment  
Portland, Oregon**

Analyte	Detection Frequency	SQL Range (Min-Max)	Detect Range (Min-Max)	Sample ID of Maximum Detection	Maximum	Arithmetic Mean
<b>ChevronTexaco Asphalt: Groundwater</b>						
<b>SVOCs in µg/L</b>						
Acenaphthene	1/5	0.05 - 10	1.04	A-5	1.0E+00	1.0E+00
<b>Metals in µg/L</b>						
Arsenic	5/5	--	0.0106 - 0.423	W-10	4.2E-01	1.1E-01
Barium	5/5	--	0.0547 - 0.897	W-10	9.0E-01	3.9E-01
Cadmium	3/5	0.0001	0.0006 - 0.0029	W-15	2.9E-03	9.4E-04
Chromium	5/5	--	0.0024 - 0.115	W-10	1.2E-01	4.8E-02
Lead	5/5	--	0.0029 - 0.0847	W-10	8.5E-02	3.2E-02

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**Acronyms and Abbreviations:**

SQL = Standard quantification limit.

Min = Minimum.

Max = Maximum.

**Table 8 - KMLT Exposure Point Concentrations: Soil and Groundwater**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

Analyte	Detection Frequency	SQL Range (Min-Max)	Detect Range (Min-Max)	Sample ID of Maximum Detection	Distribution	90 % UCL	Arithmetic Mean	EPC	
								RME	CT
Kinder Morgan: Surface Soil (0 to 3 feet bgs)									
VOCs in mg/kg									
1,2,4-Trimethylbenzene	1/5	0.1	0.71	G-SS-22	Maximum	7.1E-01	1.8E-01	7.1E-01	1.8E-01
1,3,5-Trimethylbenzene	1/5	0.1	0.58	G-SS-22	Maximum	5.8E-01	1.6E-01	5.8E-01	1.6E-01
Ethylbenzene	5/29	0.05 - 5.0	0.218 - 7.89	G-HS-2(2)	Nonparametric	1.6E+00	6.3E-01	1.6E+00	6.3E-01
Xylenes (total)	6/29	0.05 - 0.5	0.434 - 6.31	G-HS-2(2)	Nonparametric	1.7E+00	7.2E-01	1.7E+00	7.2E-01
SVOCs in mg/kg									
Benzo(a)anthracene	8/29	0.0067 - 13.4	0.0169 - 16.8	G-SS-6	Weak Lognormal	2.9E+00	9.5E-01	2.9E+00	9.5E-01
Benzo(a)pyrene	11/29	0.0067 - 13.4	0.0086 - 8.74	G-SS-6	Weak Lognormal	2.4E+00	6.8E-01	2.4E+00	6.8E-01
Chrysene	13/29	0.0067 - 13.4	0.0071 - 25.0	G-SS-6	Weak Lognormal	3.9E+00	1.2E+00	3.9E+00	1.2E+00
Naphthalene	3/29	0.0067 - 13.4	2.65 - 11.9	G-SS-6	Nonparametric	2.5E+00	1.0E+00	2.5E+00	1.0E+00
Metals in mg/kg									
Arsenic	5/5	--	2.31 - 10.5	G-SS-5	Maximum	1.1E+01	5.8E+00	1.1E+01	5.8E+00
Lead	5/5	--	16.6 - 142	G-SS-8	Maximum	1.4E+02	6.0E+01	1.4E+02	6.0E+01
TPH in mg/kg									
Aviation Gas Range	4/4	--	1,880 - 15,100	G-HS-2(2)	Maximum	1.5E+04	9.0E+03	1.5E+04	9.0E+03
KMLT: Subsurface Soil (3 to 15 feet bgs)									
VOCs in mg/kg									
Ethylbenzene	2/35	0.05 - 2.5	0.0545 - 0.37	G-HS-3(4)	Maximum	3.7E-01	9.0E-02	3.7E-01	9.0E-02
Xylenes (total)	2/35	0.05 - 2.5	0.308 - 0.815	G-HS-3(4)	Maximum	8.2E-01	1.1E-01	8.2E-01	1.1E-01
SVOCs in mg/kg									
Naphthalene	4/34	0.0067 - 13.4	0.0091 - 1.8	G-HS-3(4)	Nonparametric	9.4E-01	3.2E-01	9.4E-01	3.2E-01
TPH in mg/kg									
Aviation Gas Range	4/4	--	16.1 - 6,790	G-HS-1(5)	Maximum	6.8E+03	2.6E+03	6.8E+03	2.6E+03
KMLT: Total Soil (0 to 15 feet bgs)									
VOCs in mg/kg									
1,2,4-Trimethylbenzene	1/6	0.1	0.71	G-SS-22	Maximum	7.1E-01	1.6E-01	7.1E-01	1.6E-01
1,3,5-Trimethylbenzene	1/6	0.1	0.58	G-SS-22	Maximum	5.8E-01	1.4E-01	5.8E-01	1.4E-01
Ethylbenzene	7/64	0.05 - 5.0	0.0545 - 7.89	G-HS-2(2)	Default to Maximum	7.9E+00	3.4E-01	7.9E+00	3.4E-01
Xylenes (total)	8/64	0.05 - 2.5	0.308 - 6.31	G-HS-2(2)	Default to Maximum	6.3E+00	3.8E-01	6.3E+00	3.8E-01
SVOCs in mg/kg									
Benzo(a)anthracene	20/63	0.0067 - 13.4	0.0113 - 16.8	G-SS-6	Lognormal	9.7E-01	5.3E-01	9.7E-01	5.3E-01
Benzo(a)pyrene	23/63	0.0067 - 13.4	0.0086 - 8.74	G-SS-6	Lognormal	9.2E-01	4.1E-01	9.2E-01	4.1E-01
Bis(2-ethylhexyl)phthalate	1/6	2.0 - 100	3.85	G-HP-12(12)	Maximum	3.9E+00	1.8E+01	3.9E+00	3.9E+00
Chrysene	26/63	0.0067 - 13.4	0.0071 - 25.0	B-68	Lognormal	2.0E-01	1.8E-01	2.0E-01	1.8E-01

Please refer to notes at end of table.

**Table 8 - KMLT Exposure Point Concentrations: Soil and Groundwater**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

Analyte	Detection Frequency	SQL Range (Min-Max)	Detect Range (Min-Max)	Sample ID of Maximum Detection	Distribution	90 % UCL	Arithmetic Mean	EPC	
								RME	CT
KMLT: Total Soil (0 to 15 feet bgs), continued									
Naphthalene	7/63	0.0067 - 13.4	0.0091 - 11.9	G-SS-6	Nonparametric	1.4E+00	6.5E-01	1.4E+00	6.5E-01
Metals in mg/kg									
Arsenic	7/7	--	2.31 - 16.4	G-HP-8(8)	Lognormal	1.3E+01	6.9E+00	1.3E+01	6.9E+00
Lead	6/7	10	16.6 - 142	G-SS-8	Lognormal	1.7E+02	4.7E+01	1.4E+02	4.7E+01
TPH in mg/kg									
Aviation Gas Range	8/8	--	16.1 - 15,100	G-HS-3(2)	Normal	8.7E+03	5.8E+03	8.7E+03	5.8E+03
KMLT: Groundwater									
VOCs in µg/L									
1,2,4-Trimethylbenzene	1/10	1.0 - 5.0	1,360	MW-11	Maximum	1.4E+03	1.4E+02	1.4E+03	1.4E+02
1,3,5-Trimethylbenzene	2/10	1.0 - 2.0	5.3 - 327	MW-11	Nonparametric	1.3E+02	3.4E+01	1.3E+02	3.4E+01
Benzene	55/139	0.5 - 2.0	0.322 - 6200	MW-11	Nonparametric	5.5E+02	3.0E+02	5.5E+02	3.0E+02
Chloroform	1/10	1.0 - 100	6.79	MW-32	Maximum	6.8E+00	6.3E+00	6.8E+00	6.3E+00
Ethylbenzene	48/142	0.5 - 2.0	0.379 - 4,880	MW-22	Nonparametric	5.6E+02	3.0E+02	5.6E+02	3.0E+02
Toluene	55/145	0.5 - 5.0	0.392 - 2,820	MW-22	Nonparametric	2.9E+02	1.5E+02	2.9E+02	1.5E+02
Xylenes (total)	62/145	1.0 - 4.0	0.759 - 14,900	MW-22	Nonparametric	1.6E+03	8.7E+02	1.6E+03	8.7E+02
SVOCs in µg/L									
Bis(2-ethylhexyl)phthalate	1/10	10	15.9	MW-11	Maximum	1.6E+01	6.1E+00	1.6E+01	6.1E+00
Chrysene	7/117	0.05 - 5.0	0.0533 - 583	MW-37	Maximum	5.8E+02	5.1E+00	5.8E+02	5.1E+00
Naphthalene	34/125	0.05 - 10	0.064 - 572	MW-11	Nonparametric	7.4E+01	4.0E+01	7.4E+01	4.0E+01
2-Methylnaphthalene	1/10	5	108	MW-11	Maximum	1.1E+02	1.3E+01	1.1E+02	1.3E+01
Metals in µg/L									
Arsenic	143/153	0.1 - 2.0	1.0 - 162	MW-34	Nonparametric	3.0E+01	2.3E+01	3.0E+01	2.3E+01
Lead	99/153	1	1.0 - 78.6	MW-10	Lognormal	6.8E+00	6.0E+00	6.8E+00	6.0E+00

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**Acronyms and Abbreviations:**

EPC = Exposure point concentration.  
 PAHs = Polynuclear aromatic hydrocarbons.  
 RME = Reasonable maximum exposure.  
 bgs = Below ground surface.

TPH = Total petroleum hydrocarbons.  
 UCL = Upper confidence limit on the mean.  
 VOCs = Volatile organic compounds.

CT = Central Tendency.  
 SQL = Standard quantification limit.  
 NA = Not applicable.

**Table 9 - ChevronTexaco Exposure Point Concentrations: Soil and Groundwater  
Willbridge Terminal Risk Assessment  
Portland, Oregon**

Analyte	Detection Frequency	SQL Range (Min-Max)	Detect Range (Min-Max)	Sample ID of Maximum Detection	Distribution	90 % UCL	Arithmetic Mean	EPC	
								RME	CT
ChevronTexaco: Surface Soil (0 to 3 feet bgs)									
VOCs in mg/kg									
1,2,4-Trimethylbenzene	1/8	0.1	5.28	C-SS-12	Maximum	5.3E+00	7.0E-01	5.3E+00	7.0E-01
Toluene	3/16	0.05	0.183 - 0.517	C-SS-2	Nonparametric	1.8E-01	8.0E-02	1.8E-01	8.0E-02
Xylenes (total)	2/16	0.05	0.403 - 2.47	C-SS-12	Nonparametric	6.6E-01	2.0E-01	6.6E-01	2.0E-01
SVOCs in mg/kg									
Benzo(a)anthracene	5/16	0.028 - 0.134	0.0077 - 1.03	C-SS-5	Lognormal	2.1E-01	9.8E-02	2.1E-01	9.8E-02
Benzo(a)pyrene	9/16	0.028 - 0.134	0.0083 - 1.57	C-SS-5	Lognormal	2.0E-01	1.4E-01	2.0E-01	1.4E-01
Benzo(b)fluoranthene	9/16	0.028 - 0.134	0.008 - 1.88	C-SS-5	Lognormal	2.5E-01	1.6E-01	2.5E-01	1.6E-01
Benzo(k)fluoranthene	6/16	0.0067 - 0.134	0.0084 - 1.14	C-SS-5	Lognormal	1.9E-01	1.0E-01	1.9E-01	1.0E-01
Dibenz(a,h)anthracene	2/16	0.0067 - 0.134	0.076 - 0.587	C-SS-5	Lognormal	1.4E-01	6.0E-02	1.4E-01	6.0E-02
Indeno(1,2,3-cd)pyrene	7/16	0.0067 - 0.134	0.0068 - 1.37	C-SS-5	Lognormal	2.6E-01	1.2E-01	2.6E-01	1.2E-01
Naphthalene	2/16	0.0067 - 0.134	0.0356 - 0.523	C-SS-12	Weak Lognormal	1.1E-01	5.5E-02	1.1E-01	5.5E-02
Metals in mg/kg									
Cadmium	3/4	0.5	0.71 - 1.2	C-SS-4	Maximum	1.2E+00	7.8E-01	1.2E+00	7.8E-01
Chromium	4/4	--	7.57 - 24.7	C-SS-8	Maximum	2.5E+01	1.6E+01	2.5E+01	1.6E+01
Lead	2/4	10.0	15.1 - 24.0	C-SS-8	Maximum	2.4E+01	1.2E+01	2.4E+01	1.2E+01
ChevronTexaco: Subsurface Soil (3 to 15 feet bgs)									
VOCs in mg/kg									
Toluene	1/11	0.05 - 0.5	0.0635	C-HP-1(4)	Maximum	6.4E-02	9.0E-02	6.4E-02	6.4E-02
Xylenes (total)	2/11	0.05 - 0.5	0.0552 - 0.147	C-HP-1(12)	Weak Lognormal	2.8E-01	1.6E-01	1.5E-01	1.5E-01
ChevronTexaco: Total Soil (0 to 15 feet bgs)									
VOCs in mg/kg									
1,2,4-Trimethylbenzene	1/8	0.1	5.28	C-SS-12	Maximum	5.3E+00	7.0E-01	5.3E+00	7.0E-01
Toluene	4/27	0.05 - 0.5	0.0635 - 0.517	C-SS-2	Nonparametric	1.8E-01	1.1E-01	1.8E-01	1.1E-01
Xylenes (total)	4/27	0.05 - 0.5	0.0552 - 2.47	C-SS-12	Nonparametric	4.5E-01	1.8E-01	4.5E-01	1.8E-01
SVOCs in mg/kg									
Benzo(a)anthracene	7/27	0.0067 - 1.34	0.0077 - 1.03	C-SS-5	Lognormal	3.4E-01	1.3E-01	3.4E-01	1.3E-01
Benzo(a)pyrene	11/27	0.0067 - 0.335	0.0083 - 1.57	C-SS-5	Lognormal	1.7E-01	1.1E-01	1.7E-01	1.1E-01
Benzo(b)fluoranthene	12/27	0.0067 - 0.335	0.008 - 1.88	C-SS-5	Lognormal	2.0E-01	1.3E-01	2.0E-01	1.3E-01
Benzo(k)fluoranthene	9/27	0.0067 - 0.335	0.0084 - 1.14	C-SS-5	Lognormal	1.5E-01	8.7E+01	1.5E-01	1.5E-01
Dibenz(a,h)anthracene	2/27	0.0067 - 0.335	0.076 - 0.587	C-SS-5	Maximum	1.0E-01	5.4E-02	1.0E-01	5.4E-02
Indeno(1,2,3-cd)pyrene	9/27	0.0067 - 0.335	0.0068 - 1.37	C-SS-5	Lognormal	1.8E-01	9.7E-02	1.8E-01	9.7E-02
Naphthalene	2/27	0.0067 - 6.7	0.03556 - 0.523	C-SS-12	Maximum	5.4E-01	2.4E-01	5.2E-01	2.4E-01

Please refer to notes at end of table.

**Table 9 - ChevronTexaco Exposure Point Concentrations: Soil and Groundwater  
Willbridge Terminal Risk Assessment  
Portland, Oregon**

Analyte	Detection Frequency	SQL Range (Min-Max)	Detect Range (Min-Max)	Sample ID of Maximum Detection	Distribution	90 % UCL	Arithmetic Mean	EPC	
								RME	CT
ChevronTexaco: Total Soil (0 to 15 feet bgs), continued									
Metals in mg/kg									
Cadmium	3/4	0.5	0.71 - 1.2	C-SS-4	Maximum	1.2E+00	7.8E-01	1.2E+00	7.8E-01
Chromium	4/4	--	7.57 - 24.7	C-SS-8	Maximum	2.5E+01	1.6E+01	2.5E+01	1.6E+01
Lead	2/4	10.0	15.1 - 24.0	C-SS-8	Maximum	2.4E+01	1.2E+01	2.4E+01	1.2E+01
ChevronTexaco: Groundwater (Entire Site)									
VOCs in µg/L									
1,2,4-Trimethylbenzene	1/7	1.0 - 5.0	47.9	B-28	Weak Lognormal	7.9E+01	8.1E+00	4.8E+01	8.1E+00
Benzene	150/221	0.5 - 5.0	0.314 - 14,000	GPW-3/CR-15	Lognormal	8.2E+03	6.3E+02	8.2E+03	6.3E+02
Methyl-tertbutyl-ether	70/113	0.5 - 25	0.9 - 3,200	GPW-3	Lognormal	3.8E+02	1.3E+02	3.8E+02	1.3E+02
Toluene	144/224	0.5 - 50	0.368 - 6,000	CR-13	Default to Maximum	6.0E+03	7.0E+01	6.0E+03	7.0E+01
Xylenes (total)	138/222	0.5 - 10	0.58 - 5,500	CR-13	Lognormal	3.1E+02	2.2E+02	3.1E+02	2.2E+02
SVOCs in µg/L									
Benzo(a)anthracene	13/96	0.05 - 2.5	0.01 - 1.36	B-26	Nonparametric	2.4E-01	1.6E-01	2.4E-01	1.6E-01
Benzo(a)pyrene	14/94	0.05 - 2.5	0.0628 - 2.47	CR-8	Nonparametric	2.9E-01	1.9E-01	2.9E-01	1.9E-01
Benzo(b)fluoranthene	16/95	0.05 - 2.5	0.0855 - 2.98	B-26	Nonparametric	3.2E-01	2.0E-01	3.2E-01	2.0E-01
Benzo(k)fluoranthene	8/94	0.05 - 2.5	0.1 - 1.3	CR-8	Maximum	1.3E+00	1.4E-01	1.3E+00	1.4E-01
Indeno(1,2,3-cd)pyrene	15/94	0.05 - 2.5	0.0531 - 1.96	CR-8	Nonparametric	2.5E-01	1.6E-01	2.5E-01	1.6E-01
Naphthalene	22/96	0.05 - 12.5	0.1 - 242	B-26	Nonparametric	1.2E+01	4.6E+00	1.2E+01	4.6E+00
2-methylnaphthalene	3/7	5.0 - 50	7.77 - 41.4	B-11	Lognormal	6.9E+01	1.4E+01	4.1E+01	1.4E+01
Metals in µg/L									
Arsenic	111/115	1.0	0.5 - 82.7	CR-8	Normal	2.5E+01	2.3E+01	2.5E+01	2.3E+01
Cadmium	27/115	0.1 - 5.0	0.1 - 35.5	B-30	Nonparametric	3.4E+00	2.0E+00	3.4E+00	2.0E+00
Chromium	79/116	1.0	1.0 - 217	B-19	Lognormal	2.7E+01	1.6E+01	2.7E+01	1.6E+01
Lead	78/116	1.0	1.0 - 132	B-26	Lognormal	2.2E+01	1.4E+01	2.2E+01	1.4E+01
TPH in µg/L									
Diesel Range	19/22	50 - 600	170 - 210,000	CR-21A	Lognormal	1.3E+05	1.5E+04	1.3E+05	1.5E+04
Gasoline Range	96/110	50.0	51 - 48,000	CR-21A	Lognormal	2.5E+04	5.9E+03	2.5E+04	5.9E+03
ChevronTexaco: Groundwater (Non-ChevronTexaco Ethanol Area)									
VOCs in µg/L									
1,2,4-Trimethylbenzene	1/7	1.0 - 5.0	47.9	B-28	Weak Lognormal	7.9E+01	8.1E+00	4.8E+01	8.1E+00
Benzene	61/104	0.5	0.68 - 1,650	B-14	Lognormal	3.7E+02	6.4E+01	3.7E+02	6.4E+01
Toluene	64/107	0.5 - 5.0	0.368 - 91.4	B-14	Lognormal	8.5E+00	5.7E+00	8.5E+00	5.7E+00
Xylenes (total)	53/105	1.0 - 10	0.986 - 109	B-14	Lognormal	1.8E+01	1.1E+01	1.8E+01	1.1E+01

Please refer to notes at end of table.

**Table 9 - ChevronTexaco Exposure Point Concentrations: Soil and Groundwater  
Willbridge Terminal Risk Assessment  
Portland, Oregon**

Analyte	Detection Frequency	SQL Range (Min-Max)	Detect Range (Min-Max)	Sample ID of Maximum Detection	Distribution	90 % UCL	Arithmetic Mean	EPC	
								RME	CT
ChevronTexaco: Groundwater (Non-ChevronTexaco Ethanol Area), continued									
SVOCs in µg/L									
Benzo(a)anthracene	8/89	0.05 - 2.5	0.01 - 1.36	B-26	Maximum	1.4E+00	1.5E-01	1.4E+00	1.5E-01
Benzo(a)pyrene	7/87	0.05 - 2.5	0.0628 - 1.02	B-26	Maximum	1.0E+00	1.3E-01	1.0E+00	1.3E-01
Benzo(b)fluoranthene	10/88	0.05 - 2.5	0.0855 - 2.98	B-26	Nonparametric	2.8E-01	1.7E-01	2.8E-01	1.7E-01
Benzo(k)fluoranthene	4/87	0.05 - 2.5	0.1 - 0.3	B-21	Maximum	3.0E-01	1.2E-01	3.0E-01	1.2E-01
Indeno(1,2,3-cd)pyrene	9/87	0.05 - 2.5	0.0531 - 0.32	B-21	Nonparametric	1.8E-01	1.2E-01	1.8E-01	1.2E-01
Naphthalene	22/91	0.05 - 12.5	0.1 - 242	B-26	Nonparametric	1.3E+01	4.9E+00	1.3E+01	4.9E+00
2-methylnaphthalene	3/7	5.0 - 50	7.77 - 41.4	B-11	Lognormal	6.9E+01	1.4E+01	4.1E+01	1.4E+01
ChevronTexaco: Groundwater (ChevronTexaco Ethanol Area)									
VOCs in µg/L									
Benzene	89/117	0.5 - 5.0	0.314 - 14,000	GPW-3/CR-15	Lognormal	7.3E+04	1.1E+03	1.4E+04	1.1E+03
Methyl-tertbutyl-ether	70/113	0.5 - 25	0.9 - 3,200	GPW-3	Lognormal	3.8E+02	1.3E+02	3.8E+02	1.3E+02
Toluene	80/117	0.5 - 50	0.519 - 6,000	CR-13	Lognormal	2.7E+02	1.3E+02	2.7E+02	1.3E+02
Xylenes (total)	85/117	0.5 - 2.0	0.58 - 5,500	CR-13	Lognormal	3.7E+03	3.0E+02	3.7E+03	3.0E+02
SVOCs in µg/L									
Benzo(a)anthracene	5/7	0.1 - 0.2	0.232 - 0.981	CR-8	Lognormal	1.1E+00	3.5E-01	9.8E-01	3.5E-01
Benzo(a)pyrene	7/7	--	0.12 - 2.47	CR-8	Lognormal	2.4E+00	8.9E-01	2.4E+00	8.9E-01
Benzo(b)fluoranthene	6/7	0.1	0.301 - 1.6	CR-8	Lognormal	2.8E+00	6.6E-01	1.6E+00	6.6E-01
Benzo(k)fluoranthene	4/7	0.1 - 0.2	0.331 - 1.3	CR-8	Lognormal	2.6E+00	4.2E-01	1.3E+00	4.2E-01
Indeno(1,2,3-cd)pyrene	6/7	0.2	0.1 - 1.96	CR-8	Lognormal	2.5E-01	2.6E+00	6.6E-01	2.5E-01

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**Acronyms and Abbreviations:**

EPC = Exposure point concentration.

PAHs = Polynuclear aromatic hydrocarbons.

RME = Reasonable maximum exposure.

bgs = Below ground surface.

TPH = Total petroleum hydrocarbons.

UCL = Upper confidence limit on the mean.

VOCs = Volatile organic compounds.

CT = Central Tendency.

SQL = Standard quantification limit.

NA = Not applicable.

**Table 10 - ConocoPhillips Exposure Point Concentrations: Soil and Groundwater**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

Analyte	Detection Frequency	SQL Range (Min-Max)	Detect Range (Min-Max)	Sample ID of Maximum Detection	Distribution	90 % UCL	Arithmetic Mean	EPC	
								RME	CT
ConocoPhillips: Surface Soil (0 to 3 feet bgs)									
VOCs in mg/kg									
Benzene	1/17	0.05	0.237	T-SS-6	Maximum	2.4E-01	3.7E-02	2.4E-01	3.7E-02
Xylenes (total)	2/17	0.05	0.0724 - 1.79	T-SS-6	Default to Maximum	1.8E+00	1.3E-01	1.8E+00	1.3E-01
SVOCs in mg/kg									
Benzo(a)anthracene	4/17	0.0067 - 0.175	0.0084 - 0.408	T-SS-10	Lognormal	1.5E-01	5.7E-02	1.5E-01	5.7E-02
Benzo(a)pyrene	6/17	0.0067 - 0.175	0.0128 - 0.338	T-SS-10	Lognormal	2.4E-01	7.2E-02	2.4E-01	7.2E-02
Benzo(b)fluoranthene	5/17	0.0067 - 0.175	0.0088 - 0.594	T-SS-10	Lognormal	2.8E-01	8.3E-02	2.8E-01	8.3E-02
Chrysene	5/17	0.0067 - 0.175	0.0096 - 0.322	T-SS-10	Lognormal	1.7E-01	5.7E-02	1.7E-01	5.7E-02
Dibenz(a,h)anthracene	2/17	0.0067 - 0.175	0.0126 - 0.0829	T-SS-10	Weak Lognormal	6.5E-02	2.8E-02	6.5E-02	2.8E-02
Metals in mg/kg									
Barium	4/4	--	60 - 91.6	T-SS-6	Maximum	9.2E+01	8.0E+01	9.2E+01	8.0E+01
Chromium	4/4	--	12.8 - 18.7	T-SS-6	Maximum	1.9E+01	1.5E+01	1.9E+01	1.5E+01
Lead	2/4	10.0	23.0 - 29.1	T-SS-11	Maximum	2.9E+01	1.6E+01	2.9E+01	1.6E+01
ConocoPhillips: Subsurface Soil (3 to 15 feet bgs)									
VOCs in mg/kg									
Benzene	3/16	0.05 - 0.1	0.0864 - 0.386	T-HS-3(12)	Nonparametric	1.3E-01	5.9E-02	1.3E-01	5.9E-02
Xylenes (total)	3/16	0.05 - 0.1	0.246 - 0.592	T-HS-3(12)	Default to Maximum	5.9E-01	9.8E-02	5.9E-01	9.8E-02
TPH in mg/kg									
Gasoline Range	2/4	2.0 - 4.0	3.94 - 5.56	T-HS-3(12)	Maximum	5.6E+00	3.1E+00	5.6E+00	3.1E+00
ConocoPhillips: Total Soil (0 to 15 feet bgs)									
VOCs in mg/kg									
Benzene	4/33	0.05 - 0.1	0.0864 - 0.386	T-HS-3(12)	Nonparametric	8.6E-02	4.8E-02	8.6E-02	4.8E-02
Xylenes (total)	5/33	0.05 - 0.1	0.0724 - 1.79	T-SS-6	Default to Maximum	1.8E+00	1.2E-01	1.8E+00	1.2E-01
SVOCs in mg/kg									
Benzo(a)anthracene	8/29	0.0067 - 0.175	0.0084 - 0.408	T-SS-10	Weak Lognormal	6.6E-02	4.0E-02	6.6E-02	4.0E-02
Benzo(a)pyrene	9/29	0.0067 - 0.175	0.0128 - 0.338	T-SS-10	Weak Lognormal	9.6E-02	4.8E-02	9.6E-02	4.8E-02
Benzo(b)fluoranthene	8/29	0.0067 - 0.175	0.0088 - 0.594	T-SS-10	Weak Lognormal	9.5E-02	5.4E-02	9.5E-02	5.4E-02
Chrysene	8/29	0.0067 - 0.175	0.0096 - 0.322	T-SS-10	Weak Lognormal	7.3E-02	3.9E-02	7.3E-02	3.9E-02
Dibenz(a,h)anthracene	4/29	0.0067 - 0.175	0.0084 - 0.0829	T-SS-10	Weak Lognormal	3.4E-02	2.1E-02	3.4E-02	2.1E-02
Metals in mg/kg									
Barium	5/5	--	60 - 91.6	T-SS-6	Maximum	9.2E+01	8.1E+01	9.2E+01	8.1E+01
Chromium	5/5	--	12.0 - 18.7	T-SS-6	Maximum	1.9E+01	1.4E+01	1.9E+01	1.4E+01
Lead	3/5	10.0	13.3 - 29.1	T-SS-11	Maximum	2.9E+01	1.5E+01	2.9E+01	1.5E+01

Please refer to notes at end of table.



**Table 10 - ConocoPhillips Exposure Point Concentrations: Soil and Groundwater**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

Analyte	Detection Frequency	SQL Range (Min-Max)	Detect Range (Min-Max)	Sample ID of Maximum Detection	Distribution	90 % UCL	Arithmetic Mean	EPC	
								RME	CT
ConocoPhillips: Total Soil (0 to 15 feet bgs), continued									
TPH in mg/kg									
Gasoline Range	2/4	2.0 - 4.0	3.94 - 5.56	T-HS-3(12)	Maximum	5.6E+00	3.1E+00	5.6E+00	3.1E+00
ConocoPhillips: Groundwater									
VOCs in µg/L									
1,2,4-Trimethylbenzene	3/8	1.0 - 2.0	5.42 - 64.5	B-6	Weak Lognormal	1.3E+02	1.0E+01	6.5E+01	1.0E+01
1,3,5-Trimethylbenzene	3/8	1.0 - 2.0	1.85 - 36.2	B-6	Weak Lognormal	6.9E+01	6.9E+00	3.6E+01	6.9E+00
Benzene	52/99	0.5 - 2.5	0.355 - 712	B-17	Nonparametric	8.6E+01	5.1E+01	8.6E+01	5.1E+01
n-propylbenzene	5/8	1.0	2.49 - 250	B-6	Lognormal	1.6E+04	4.8E+01	2.5E+02	4.8E+01
Xylenes (total)	47/98	1.0 - 5.0	1.16 - 237	B-6	Nonparametric	2.3E+01	1.2E+01	2.3E+01	1.2E+01
SVOCs in µg/L									
Benzo(a)anthracene	15/83	0.05 - 5	0.0051 - 29.6	B-35	Nonparametric	2.0E+00	7.7E-01	2.0E+00	7.7E-01
Benzo(b)fluoranthene	5/83	0.05 - 50	0.0936 - 3.69	B-35	Maximum	3.7E+00	6.8E-01	3.7E+00	6.8E-01
Chrysene	14/83	0.05 - 25	0.0613 - 13.5	B-35	Nonparametric	1.2E+00	5.4E-01	1.2E+00	5.4E-01
Naphthalene	13/84	0.05 - 50	0.16 - 91.2	B-6	Weak Lognormal	5.4E+00	4.8E+00	5.4E+00	4.8E+00
Metals in µg/L									
Arsenic	101/102	10	1.1 - 897	B-37	Nonparametric	9.4E+01	5.8E+01	9.4E+01	5.8E+01
Barium	102/102	--	34.2 - 3,390	U-10	Nonparametric	3.1E+02	2.0E+02	3.1E+02	2.0E+02
Chromium	92/95	1.0 - 10	1.0 - 317	B-18	Lognormal	9.1E+01	2.3E+01	9.1E+01	2.3E+01
Lead	91/101	1.0 - 10.2	1.1 - 176	U-10	Lognormal	1.9E+01	3.0E+03	1.9E+01	1.9E+01

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**Acronyms and Abbreviations:**

EPC = Exposure point concentration.  
PAHs = Polynuclear aromatic hydrocarbons.  
RME = Reasonable maximum exposure.  
bgs = Below ground surface.

TPH = Total petroleum hydrocarbons.  
UCL = Upper confidence limit on the mean.  
VOCs = Volatile organic compounds.

CT = Central Tendency.  
SQL = Standard quantification limit.  
NA = Not applicable.

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**Table 11 - Willbridge Terminal Utility Worker Exposure Point Concentrations: Soil and Groundwater**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

Analyte	Detection Frequency	SQL Range (Min-Max)	Detect Range (Min-Max)	Sample ID of Maximum Detection	Distribution	90 % UCL	Arithmetic Mean	EPC	
								RME	CT
Willbridge Terminal Utility Worker: Total Soil (0 to 16 feet bgs)									
VOCs in mg/kg									
n-propylbenzene	1/7	0.1	2.43	UB-4(12)	Maximum	2.4E+00	3.9E-01	2.4E+00	3.9E-01
Xylenes (total)	3/36	0.05	0.308 - 3.79	UB-5(12)	Maximum	3.8E+00	1.7E-01	3.8E+00	1.7E-01
SVOCs in mg/kg									
Benzo(a)anthracene	18/36	0.0067 - 0.67	0.0072 - 0.352	UB-7(9)	Weak Lognormal	1.0E-01	5.0E-02	1.0E-01	5.0E-02
Benzo(a)pyrene	17/36	0.0067 - 0.67	0.0078 - 0.28	G-HP-3(11)	Weak Lognormal	1.1E-01	5.0E-02	1.1E-01	5.0E-02
Benzo(b)fluoranthene	17/36	0.0067 - 0.67	0.0083 - 0.169	G-HP-3(11)	Weak Lognormal	8.0E-02	4.0E-02	8.0E-02	4.0E-02
Dibenz(a,h)anthracene	7/36	0.0067 - 50	0.0084 - 0.0446	UB-7(9)	Default to Maximum	4.5E-02	8.7E-01	4.5E-02	4.5E-02
Indeno(1,2,3-cd)pyrene	14/36	0.0067 - 0.67	0.0091 - 0.103	G-HP-13(9)	Default to Maximum	1.0E-01	3.0E-02	1.0E-01	3.0E-02
Naphthalene	5/36	0.0067 - 0.168	0.0091 - 0.102	UB-5(8)	Default to Maximum	1.0E-01	2.0E-02	1.0E-01	2.0E-02
Metals in mg/kg									
Arsenic	7/7	--	1.2 - 7.89	UB-5(12)	Lognormal	5.2E+00	3.4E+00	5.2E+00	3.4E+00
Chromium	7/7	--	10.2 - 20.9	UB-4(12)	Default to Maximum	2.1E+01	1.9E+01	2.1E+01	1.9E+01
Lead	1/7	10.0	34.9	UB-5(12)	Default to Maximum	3.5E+01	9.3E+00	3.5E+01	9.3E+00
Willbridge Terminal Utility Worker: Groundwater (Entire Site)									
VOCs in µg/L									
1,2,4-Trimethylbenzene	3/7	1.0 - 5.0	5.42 - 64.5	B-6	Lognormal	9.7E+02	1.8E+01	6.5E+01	1.8E+01
1,3,5-Trimethylbenzene	3/7	1.0 - 5.0	9.77 - 36.2	B-6	Lognormal	1.5E+02	9.4E+00	3.6E+01	9.4E+00
Benzene	43/72	0.5	0.754 - 658	B-24	Lognormal	1.9E+02	3.6E+01	1.9E+02	3.6E+01
n-propylbenzene	6/7	1.0	6.63 - 250	B-6	Lognormal	5.4E+03	6.0E+01	2.5E+02	6.0E+01
Xylenes (total)	37/72	1.0 - 10	0.986 - 237	B-6	Lognormal	2.5E+01	1.4E+01	2.5E+01	1.4E+01
SVOCs in µg/L									
Benzo(a)anthracene	6/60	0.05 - 50	0.0513 - 1.27	B-24	Maximum	1.3E+00	9.7E-01	1.3E+00	9.7E-01
Benzo(a)pyrene	4/60	0.05 - 50	0.0628 - 0.203	B-24	Maximum	2.0E-01	9.5E-01	2.0E-01	2.0E-01
Benzo(b)fluoranthene	5/61	0.05 - 50	0.0777 - 0.547	B-11	Maximum	5.5E-01	9.4E-01	5.5E-01	5.5E-01
Indeno(1,2,3-cd)pyrene	4/60	0.05 - 50	0.0502 - 0.1	B-28	Maximum	1.0E-01	9.4E-01	1.0E-01	1.0E-01
Naphthalene	15/64	0.05 - 12.5	0.1 - 91.2	B-6	Default to Maximum	9.1E+01	5.5E+00	9.1E+01	5.5E+00
2-methylnaphthalene	2/6	5.0 - 50	7.77 - 41.4	B-11	Lognormal	1.3E+02	1.7E+01	4.1E+01	1.7E+01
Metals in µg/L									
Arsenic	69/72	1.0	1.2 - 116	MW-25	Default to Maximum	1.2E+02	2.2E+01	1.2E+02	2.2E+01
Cadmium	17/72	0.1 - 5.0	0.1 - 35.5	B-30	Default to Maximum	3.6E+01	1.8E+00	3.6E+01	1.8E+00
Chromium	50/72	1.0	1.0 - 145	B-19	Lognormal	2.2E+01	1.4E+01	2.2E+01	1.4E+01
Lead	53/72	1.0	1.1 - 96.5	B-26	Lognormal	2.0E+01	1.2E+01	2.0E+01	1.2E+01

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**Acronyms and Abbreviations:**

EPC = Exposure point concentration.  
PAHs = Polynuclear aromatic hydrocarbons.  
RME = Reasonable maximum exposure.  
bgs = Below ground surface.

TPH = Total petroleum hydrocarbons.  
UCL = Upper confidence limit on the mean.  
VOCs = Volatile organic compounds.

CT = Central Tendency.  
SQL = Standard quantification limit.  
NA = Not applicable.

**Table 12 - Exposure Dose Equations and Exposure Factor Values: Soil Ingestion  
Willbridge Terminal Risk Assessment  
Portland, Oregon**

$\text{LADD}^a(\text{mg/kg-d}) = \frac{C_{\text{soil}} \times \text{IRS} \times \text{CF} \times \text{EF} \times \text{ED} \times \text{FI}}{\text{BW} \times \text{At}_{\text{carc}}}$		
$\text{ADD}^b(\text{mg/kg-d}) = \frac{C_{\text{soil}} \times \text{IRS} \times \text{CF} \times \text{EF} \times \text{ED} \times \text{FI}}{\text{BW} \times \text{At}_{\text{non}}}$		
EXPOSURE FACTOR (units)	RME <sup>e</sup> Value	CT <sup>f</sup> Value
C <sub>soil</sub> = Chemical concentration in soil (mg/kg)	UCL <sub>90</sub> <sup>c</sup>	Arithmetic Mean
CF = Conversion factor (kg/mg)	10 <sup>-6</sup>	10 <sup>-6</sup>
IRS = Incidental Soil Ingestion Rate (mg/d)		
Site Worker	100 <sup>d</sup>	50 <sup>d</sup>
Trench/Utility Worker	330 <sup>d</sup>	100 <sup>d</sup>
Landscape Worker	330 <sup>d</sup>	100 <sup>d</sup>
EF = Exposure frequency (days/year)		
Site Worker	250 <sup>d</sup>	250 <sup>d</sup>
Trench/Utility Worker	9 <sup>d</sup>	9 <sup>d</sup>
Landscape Worker	125 <sup>g</sup>	125 <sup>g</sup>
ED = Exposure duration (year)		
Site Worker	25 <sup>d</sup>	6 <sup>d</sup>
Trench/Utility Worker	1 <sup>d</sup>	1 <sup>e</sup>
Landscape Worker	1 <sup>d</sup>	1 <sup>e</sup>
FI = Fraction Ingested (unitless)		
Site Worker	1.0 <sup>g</sup>	0.25 <sup>g</sup>
Trench/Utility Worker	1.0 <sup>d</sup>	0.25 <sup>d</sup>
Landscape Worker	1.0 <sup>d</sup>	0.25 <sup>d</sup>
BW = Body weight (kg)		
Adult	70 <sup>d</sup>	70 <sup>d</sup>
AT <sub>carc</sub> = Averaging time for carcinogens (days)	25,550 <sup>d</sup>	25,550 <sup>d</sup>
AT <sub>non</sub> = Averaging time for noncarcinogens (days)	ED (years) x 365 days/year	ED (years) x 365 days/year

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**Notes:**

- <sup>(a)</sup> Lifetime average daily dose, the intake value used to evaluate potential carcinogenic effects.
- <sup>(b)</sup> Average daily dose, the intake value used to evaluate potential noncarcinogenic effects.
- <sup>(c)</sup> An upper one-sided 90 percent confidence limit of the mean or the maximum concentration (whichever is lower) used for the RME.
- <sup>(d)</sup> DEQ 2000a, 2003 (these Trench/Utility/Landscape Worker values based on DEQ's Excavation Worker Scenario).
- <sup>(e)</sup> Reasonable maximum exposure.
  - <sup>(f)</sup> Central Tendency.
  - <sup>(g)</sup> Best professional judgment, see text for further discussion.

**Table 13 - Exposure Dose Equations and Exposure Factor Values:  
Dermal Contact with Soil  
Willbridge Terminals Risk Assessment  
Portland, Oregon**

$\text{LADD}^a \text{ (mg/kg-d)} = \frac{C_{\text{soil}} \times \text{AF} \times \text{SA} \times \text{DAF} \times \text{EF} \times \text{EV} \times \text{ED} \times \text{CF} \times \text{FC}}{\text{BW} \times \text{At}_{\text{carc}}}$		
$\text{ADD}^b \text{ (mg/kg-d)} = \frac{C_{\text{soil}} \times \text{AF} \times \text{SA} \times \text{DAF} \times \text{EF} \times \text{ED} \times \text{CF} \times \text{FC}}{\text{BW} \times \text{At}_{\text{non}}}$		
Exposure Factor (units)	RME <sup>e</sup> Value	CT <sup>f</sup> Value
$C_{\text{soil}}$ = Chemical concentration in soil (mg/kg)	UCL <sub>90</sub> <sup>c</sup>	Arithmetic Mean
AF = Soil-to-skin adherence factor (mg/cm <sup>2</sup> -event)		
Site Worker	0.1 <sup>d</sup>	0.02 <sup>d</sup>
Trench/Utility Worker	0.3 <sup>d</sup>	0.1 <sup>d</sup>
Landscape Worker	0.3 <sup>d</sup>	0.1 <sup>d</sup>
SA = Skin surface area (cm <sup>2</sup> /day)		
Site Worker	3300 <sup>d</sup>	3300 <sup>d</sup>
Trench/Utility Worker	3300 <sup>d</sup>	3300 <sup>d</sup>
Landscape Worker	3300 <sup>d</sup>	3300 <sup>d</sup>
DAF = Dermal absorption factor (unitless)	Chemical-specific	Chemical-specific
EF = Exposure frequency (days/year)		
Site Worker	250 <sup>d</sup>	250 <sup>d</sup>
Trench/Utility Worker	9 <sup>d</sup>	9 <sup>d</sup>
Landscape Worker	125 <sup>g</sup>	125 <sup>g</sup>
EV = Event frequency (events per day)		
Site Worker	1 <sup>d</sup>	1 <sup>d</sup>
Trench/Utility Worker	2 <sup>d</sup>	2 <sup>d</sup>
Landscape Worker	2 <sup>d</sup>	2 <sup>d</sup>
ED = Exposure duration (years)		
Site Worker	25 <sup>d</sup>	6 <sup>d</sup>
Trench/Utility Worker	1 <sup>d</sup>	1 <sup>d</sup>
Landscape Worker	1 <sup>d</sup>	1 <sup>d</sup>
CF = Conversion factor (kg/mg)	10 <sup>-6</sup>	10 <sup>-6</sup>
FC = Fraction Contaminated (unitless)		
Site Worker	1.0 <sup>g</sup>	0.25 <sup>g</sup>
Trench/Utility Worker	1.0 <sup>g</sup>	0.25 <sup>g</sup>
Landscape Worker	1.0 <sup>g</sup>	0.25 <sup>g</sup>
BW = Body weight (kg)		
Adult	70 <sup>d</sup>	70 <sup>d</sup>
At <sub>carc</sub> = Averaging time for carcinogens (days)	25,550 <sup>d</sup>	25,550 <sup>d</sup>
At <sub>non</sub> = Averaging time for noncarcinogens (days)	ED (years) x 365 days/year <sup>d</sup>	ED (years) x 365 days/year <sup>d</sup>

F:\DATA\Jobs\15302 - Willbridge Terminal Group - Risk Assessment Revision\2 - Risk Assessment Report\01 - Final Tables\Table13Dermal

**Notes:**

- (a) Lifetime absorbed daily dose, intake value used to evaluate potential carcinogenic effects.
- (b) Absorbed daily dose, intake value used to evaluate potential noncarcinogenic effects.
- (c) An upper one-sided 90 percent confidence limit of the mean or the maximum concentration (whichever is lower) was used for the RME.
- (d) DEQ 2000a, 2003 (these Trench/Utility/Landscape Worker values based on DEQ's Excavation Worker Scenario).
- (e) Reasonable maximum exposure.
  - (f) Central Tendency.
  - (g) Best professional judgment, see text for further discussion.

**Table 14 - Exposure Dose Equations and Exposure Factor Values:  
Inhalation of Dust  
Willbridge Terminals Risk Assessment  
Portland, Oregon**

$\text{LADD}^a \text{ (mg/kg-d)} = \frac{\text{PM}_{10} \times \text{IR} \times \text{EF} \times \text{ED} \times \text{FI}}{\text{BW} \times \text{At}_{\text{carc}}}$ $\text{ADD}^b \text{ (mg/kg-d)} = \frac{\text{PM}_{10} \times \text{IR} \times \text{EF} \times \text{ED} \times \text{FI}}{\text{BW} \times \text{At}_{\text{non}}}$		
Exposure Factor (units)	RME <sup>f</sup> Value	CT <sup>g</sup> Value
PM <sub>10</sub> <sup>d</sup> = Respirable particulate concentration in air (mg/m <sup>3</sup> )	UCL <sub>90</sub> <sup>c</sup>	Arithmetic Mean
IR = Inhalation rate (m <sup>3</sup> /day)		
Site Worker	7 <sup>e</sup>	7 <sup>e</sup>
Trench/Utility Worker	7 <sup>e</sup>	7 <sup>e</sup>
Landscape Worker	7 <sup>e</sup>	7 <sup>e</sup>
EF = Exposure frequency (days/year)		
Site Worker	250 <sup>e</sup>	250 <sup>e</sup>
Trench/Utility Worker	9 <sup>e</sup>	9 <sup>e</sup>
Landscape Worker	125 <sup>h</sup>	250 <sup>h</sup>
ED = Exposure duration (years)		
Site Worker	25 <sup>e</sup>	6 <sup>e</sup>
Trench/Utility Worker	1 <sup>e</sup>	1 <sup>e</sup>
Landscape Worker	1 <sup>e</sup>	1 <sup>e</sup>
FI = Fraction Inhaled (unitless)		
Site Worker	1.0 <sup>h</sup>	0.25 <sup>h</sup>
Trench/Utility Worker	1.0 <sup>h</sup>	0.25 <sup>h</sup>
Landscape Worker	1.0 <sup>h</sup>	0.25 <sup>h</sup>
BW = Body weight (kg)		
Adult	70 <sup>e</sup>	70 <sup>e</sup>
At <sub>carc</sub> = Averaging time for carcinogens (days)	25,550 <sup>e</sup>	25,550 <sup>e</sup>
At <sub>non</sub> = Averaging time for noncarcinogens (days)	ED (years) x 365 days/year	ED (years) x 365 days/year

F:\DATA\Jobs\15302 - Willbridge Terminal Group - Risk Assessment Revision\2 - Risk Assessment Report\01 - Final Tables\Table14

**Notes:**

(a) Lifetime average daily dose, intake value used to evaluate potential carcinogenic effects.

(b) Average daily dose, intake value used to evaluate potential noncarcinogenic effects.

(c) Upper one-sided 90 percent confidence limit of the mean or the maximum concentration (whichever is lower) was used for the RME.

(d) PM<sub>10</sub> was derived using the Particulate Emission Factor equation presented in DEQ guidance (2000a); PEF = 1.32 x 10<sup>9</sup> m<sup>3</sup>/kg.

(e) DEQ 2000a, 2003 (these Trench/Utility/Landscape Worker values based on DEQ's Excavation Worker Scenario).

(f) Reasonable maximum exposure.

(g) Central Tendency.

(h) Best professional judgment, see text for further discussion.

**Table 15 - Exposure Dose Equations and Exposure Factor Values:  
Inhalation of Volatiles  
Willbridge Terminals Risk Assessment  
Portland, Oregon**

$\text{LADD}^a \text{ (mg/kg-d)} = \frac{C_{\text{air}} \times \text{IR} \times \text{EF} \times \text{ED} \times \text{FI}}{\text{BW} \times \text{At}_{\text{carc}}}$		
$\text{ADD}^b \text{ (mg/kg-d)} = \frac{C_{\text{air}} \times \text{IR} \times \text{EF} \times \text{ED} \times \text{FI}}{\text{BW} \times \text{At}_{\text{non}}}$		
Exposure Factor (units)	RME <sup>f</sup> Value	CT <sup>g</sup> Value
$C_{\text{air}}^d$ = Chemical concentration in air (mg/m <sup>3</sup> )	UCL <sub>90</sub> <sup>c</sup>	Arithmetic Mean
IR = Inhalation rate (m <sup>3</sup> /day)		
Site Worker	7 <sup>e</sup>	7 <sup>e</sup>
Trench/Utility Worker	7 <sup>e</sup>	7 <sup>e</sup>
Landscape Worker	7 <sup>e</sup>	7 <sup>e</sup>
EF = Exposure frequency (days/year)		
Site Worker	250 <sup>e</sup>	250 <sup>e</sup>
Trench/Utility Worker	9 <sup>e</sup>	9 <sup>e</sup>
Landscape Worker	125 <sup>h</sup>	125 <sup>h</sup>
ED = Exposure duration (years)		
Site Worker	25 <sup>e</sup>	6 <sup>e</sup>
Trench/Utility Worker	1 <sup>e</sup>	1 <sup>e</sup>
Landscape Worker	1 <sup>e</sup>	1 <sup>e</sup>
FI = Fraction Inhaled (unitless)		
Site Worker	1.0 <sup>h</sup>	0.25 <sup>h</sup>
Trench/Utility Worker	1.0 <sup>h</sup>	0.25 <sup>h</sup>
Landscape Worker	1.0 <sup>h</sup>	0.25 <sup>h</sup>
BW = Body weight (kg)		
Adult	70 <sup>e</sup>	70 <sup>e</sup>
AT <sub>carc</sub> = Averaging time for carcinogens (days)	25,550 <sup>e</sup>	25,550 <sup>e</sup>
At <sub>non</sub> = Averaging time for noncarcinogens (days)	ED (years) x 365 days/year	ED (years) x 365 days/year

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**Notes:**

- (a) Lifetime average daily dose, intake value used to evaluate potential carcinogenic effects.
- (b) Average daily dose, intake value used to evaluate potential noncarcinogenic effects.
- (c) Upper one-sided 90 percent confidence limit of the mean or the maximum concentration (whichever is lower) was used for the RME.
- (d) Cair was derived from soil and groundwater concentrations using models presented in DEQ guidance (2000a and 2003).
- (e) DEQ 2000a, 2003 (these Trench/Utility/Landscape Worker values based on DEQ's Excavation Worker Scenario).
- (f) Reasonable maximum exposure.
- (g) Central Tendency.
- (h) Best professional judgment, see text for further discussion.

**Table 16 - Exposure Dose Equations and Exposure Factor Values:  
Dermal Contact with Groundwater  
Willbridge Terminals Risk Assessment  
Portland, Oregon**

$LADD^a \text{ (mg/kg-d)} = \frac{DA_{\text{water}} \times SA \times EF_{\text{evd}} \times EF_{\text{dy}} \times ED \times FC}{BW \times At_{\text{carc}}}$		
$ADD^b \text{ (mg/kg-d)} = \frac{DA_{\text{water}} \times SA \times EF_{\text{evd}} \times EF_{\text{dy}} \times ED \times FC}{BW \times At_{\text{non}}}$		
Exposure Factor (units)	RME <sup>e</sup> Value	CT <sup>f</sup> Value
DA <sub>water</sub> = Dose absorbed per unit area per event (mg/cm <sup>2</sup> /event)	See note <sup>c</sup>	See note <sup>c</sup>
SA = Skin surface area (cm <sup>2</sup> ) Trench/Utility Worker	5700 <sup>d</sup>	5700 <sup>d</sup>
EF <sub>evd</sub> = Exposure frequency (events/day) Trench/Utility Worker	2 <sup>d</sup>	2 <sup>d</sup>
EF <sub>dy</sub> = Exposure frequency (days/year) Trench/Utility Worker	9 <sup>d</sup>	9 <sup>d</sup>
ED = Exposure duration (years) Trench/Utility Worker	1 <sup>d</sup>	1 <sup>d</sup>
FC = Fraction Contacted (unitless) Trench/Utility Worker	1 <sup>g</sup>	0.25 <sup>g</sup>
BW = Body weight (kg) Adult	70 <sup>d</sup>	70 <sup>d</sup>
AT <sub>carc</sub> = Averaging time for carcinogens (days)	25,550 <sup>d</sup>	25,550 <sup>d</sup>
AT <sub>non</sub> = Averaging time for noncarcinogens (days)	ED (years) x 365 days/year <sup>d</sup>	ED (years) x 365 days/year <sup>c</sup>

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**Notes:**

<sup>(a)</sup> Lifetime absorbed daily dose, intake value used to evaluate potential carcinogenic effects.

<sup>(b)</sup> Absorbed daily dose, intake value used to evaluate potential noncarcinogenic effects.

<sup>(c)</sup> DA<sub>water</sub> will be calculated using the equations presented in Appendix A, Section A.7 of DEQ guidance (2000a). The RME and CT exposure time per event (t<sub>event</sub>) for trench/utility workers will be 2 hours. An upper one-sided 90 percent confidence limit of the mean or the maximum detected concentration (whichever is lower) was used for the RME groundwater concentrations, while the arithmetic mean was used as the CT groundwater concentration.

<sup>(d)</sup> DEQ (2000a and 2003). (these Trench/Utility Worker values based on DEQ's Excavation Worker Scenario).

<sup>(e)</sup> Reasonable maximum exposure.

<sup>(f)</sup> Central Tendency.

<sup>(g)</sup> Best professional judgment, see text for further discussion.

**Table 17 - Noncarcinogenic Toxicity Factors**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

Compound of Potential Concern	Oral RfD Citation	Oral RfD in mg/kg-day	Critical Effect	Uncertainty Factor	Inhalation RfD Citation	Inhalation RfD in mg/kg-day	Critical Effect	Uncertainty Factor
<b>VOCs</b>								
1,2,4-Trimethylbenzene	NCEA	5.00E-02	--	--	NCEA	1.70E-03	--	--
1,3,5-Trimethylbenzene	NCEA	5.00E-02	--	--	NCEA	1.70E-03	--	--
Benzene	IRIS	4.00E-03	Decreased lymphocyte count	300	IRIS	9.00E-03	Decreased lymphocyte count	300
Ethylbenzene	IRIS	1.00E-01	Liver and kidney toxicity	1000	IRIS	2.90E-01	Developmental toxicity	300
Methyl-tertbutyl-ether	Route-to-Route	8.60E-01	--	--	IRIS	8.60E-01	Liver and kidney effects	100
n-Propylbenzene	NCEA	4.00E-02	--	--	Route-to Route	4.00E-02	--	--
Toluene	IRIS	2.00E-01	Changes in liver and kidney weights	1000	IRIS	1.10E-01	Neurological effects	300
Xylene	IRIS	2.00E-01	Decreased body weight; increased mortality	1000	IRIS	2.90E-02	Impaired motor coordination	300
<b>SVOCs</b>								
2-Methylnaphthalene	see Naphthalene	--	--	--	--	--	--	--
Bis(2-ethylhexyl)phthalate	IRIS	2.00E-02	Increased relative liver weight	1000	Route-to Route	2.20E-02	--	--
Naphthalene	IRIS	2.00E-02	Decreased body weight in males	3000	IRIS	8.60E-04	Nasal effects; hyperplasia and metaplasia in respiratory and olfactory epithelium, respectively	3000
<b>Metals</b>								
Arsenic	IRIS	3.00E-04	Hyperpigmentation, keratosis, and possible vascular complications	3	--	--	--	--
Barium	IRIS	7.00E-02	Increased kidney weight	3	EPA Region 9	1.40E-04	--	--
Cadmium <sup>2</sup>	IRIS	5.00E-04	Significant proteinuria	10	--	--	--	--
Chromium <sup>1,2</sup>	IRIS	3.00E-03	None reported	300	IRIS	2.90E-05	Lactate dehydrogenase in bronchoalveolar lavage fluid	300

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**Notes:**

(1) Chromium conservatively assumed to be hexavalent chromium.

(2) Cadmium and chromium oral RfDs adjusted to evaluate dermal pathway using gastrointestinal absorption factors (2.5 percent for both) obtained from EPA dermal guidance (EPA, 2001).

IRIS = Integrated Risk Information System (On-line Database).

NCEA = National Center for Environmental Assessment; obtained from EPA Region 9 PRGs Table 2002 Update (EPA, 2002).

-- = Not Available or Not Applicable.

RfD = Reference Dose.

VOCs = Volatile organic compounds.

SVOCs = Semivolatile organic compounds.

PCBs = Polychlorinated biphenyls.



**Table 18 - Carcinogenic Toxicity Factors**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

**Carcinogenic Toxicity Values**

Compound of Potential Concern	Oral CSF Citation	Oral CSF In (mg/kg-day) <sup>-1</sup>	Type of Cancer	Slope Factor/ Unit Risk				Weight of Evidence
				Weight of Evidence	Inhalation CSF Citation	Inhalation CSF In (mg/kg-day) <sup>-1</sup>	Type of Cancer	
<b>VOCs</b>								
Benzene	IRIS	5.5E-02	Leukemia	A	IRIS	2.9E-02	Leukemia	A
Methyl-terbutyl-ether	NCEA	3.3E-03	--	--	NCEA	3.5E-04	--	--
<b>SVOCs</b>								
Benzo(a)anthracene	IRIS	7.3E-01	see Benzo(a)pyrene	B2	EPA Region 9	7.3E-01	NA	NA
Benzo(a)pyrene	IRIS	7.3E+00	Stomach, larynx, and esophagus	B2	EPA Region 9	7.3E+00	NA	NA
Benzo(b)fluoranthene	IRIS	7.3E-01	see Benzo(a)pyrene	B2	EPA Region 9	7.3E-01	NA	NA
Benzo(k)fluoranthene	IRIS	7.1E-02	see Benzo(a)pyrene	B2	EPA Region 9	7.1E-02	NA	NA
			Hepatocellular carcinoma and adenoma					
Bis(2-ethylhexyl)phthalate	IRIS	1.4E-02		B2	Route-to-Route	1.4E-02	--	--
Chrysene	IRIS	7.1E-03	see Benzo(a)pyrene	B2	EPA Region 9	7.1E-03	NA	NA
Dibenz(a,h)anthracene	IRIS	7.3E+00	see Benzo(a)pyrene	B2	EPA Region 9	7.3E+00	NA	NA
Indeno(1,2,3-cd)pyrene	IRIS	7.3E-01	see Benzo(a)pyrene	B2	EPA Region 9	7.3E-01	NA	NA
<b>Metals</b>								
Arsenic	IRIS	1.5E+00	Skin	A	IRIS	1.5E+01	Lung	A
Cadmium	--	--	--	--	IRIS	6.3E+00	Lung, trachea, bronchus	B1
Chromium <sup>1</sup>	--	--	--	D	4.2E+01	--	--	A

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**Notes:**

<sup>(1)</sup> Chromium conservatively assumed to be hexavalent chromium.

IRIS = Integrated Risk Information System (On-line Database).

NCEA = National Center for Environmental Assessment; obtained from EPA Region 9 PRGs Table 2002 Update (EPA, 2002).

-- = Not Available or Not Applicable.

CSF = Carcinogenic slope factor.

VOCs = Volatile organic compounds.

SVOCs = Semivolatile organic compounds.

A = Human carcinogen.

B2 = Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals.

Table 19 - KMLT Human Health Risk and Hazard Summary: By Exposure Pathway  
Willbridge Terminal Risk Assessment  
Portland, Oregon

Reasonable Maximum Exposure

Exposure Pathways		RISK SUMMARY			HAZARD SUMMARY		
		Industrial Worker	Trench Worker	Landscape Worker	Industrial Worker	Trench Worker	Landscape Worker
Soil Pathways	Ingestion	1.E-05	4.E-08	NA	3.E-02	5.E-03	NE
	Dermal Contact	4.E-06	2.E-08	NA	3.E-03	9.E-04	NE
	<b>TOTAL SOIL</b>	<b>2.E-05</b>	<b>6.E-08</b>	<b>NA</b>	<b>4.E-02</b>	<b>6.E-03</b>	<b>NE</b>
Air Pathways	Outdoor Air						
	Fugitive Dust	3.E-09	5.E-12	NA	2.E-07	5.E-09	NA
	Volatilization from Surface Soil	0.E+00	NA	NA	5.E-03	NA	NA
	Volatilization from Subsurface Soil	0.E+00	NA	NA	1.E-03	NA	NA
	Volatilization from Surface and Subsurface Soil	NA	0.E+00	NA	NA	4.E-04	NA
	Volatilization from Groundwater	5.E-08	NE	5.E-07	7.E-03	NE	1.E-02
	<b>Outdoor Air Total<sup>1</sup></b>	<b>5.E-08</b>	<b>5.E-12</b>	<b>5.E-07</b>	<b>7.E-03</b>	<b>4.E-04</b>	<b>1.E-02</b>
	Indoor Air						
	Volatilization from Soil	0.E+00	NA	NA	1.E-02	NA	NA
	Volatilization from Groundwater	2.E-07	NA	NA	4.E-02	NA	NA
	<b>Indoor Air Total<sup>2</sup></b>	<b>2.E-07</b>	<b>NA</b>	<b>NA</b>	<b>4.E-02</b>	<b>NA</b>	<b>NA</b>
	<b>TOTAL AIR<sup>3</sup></b>	<b>2.E-07</b>	<b>5.E-12</b>	<b>5.E-07</b>	<b>4.E-02</b>	<b>4.E-04</b>	<b>1.E-02</b>
Groundwater Pathways	Inhalation of Volatiles and Dermal Contact with Groundwater (SVOCs and VOCs)	NA	2.E-06	NA	NA	2.E+00	NA
	Dermal Contact with Groundwater (metals)	NA	5.E-09	NA	NA	3.E-05	NA
<b>TOTALS</b>		<b>2.E-05</b>	<b>2.E-06</b>	<b>5.E-07</b>	<b>7.E-02</b>	<b>2.E+00</b>	<b>1.E-02</b>

Central Tendency Exposure

Exposure Pathways		RISK SUMMARY			HAZARD SUMMARY		
		Industrial Worker	Trench Worker	Landscape Worker	Industrial Worker	Utility Worker	Landscape Worker
Soil Pathways	Ingestion	2.E-07	2.E-09	NA	2.E-03	2.E-04	NA
	Dermal Contact	1.E-08	6.E-10	NA	9.E-05	4.E-05	NA
	<b>TOTAL SOIL</b>	<b>2.E-07</b>	<b>2.E-09</b>	<b>NA</b>	<b>2.E-03</b>	<b>2.E-04</b>	<b>NA</b>
Air Pathways	Outdoor Air						
	Fugitive Dust	1.E-10	7.E-13	NA	2.E-08	5.E-10	NA
	Volatilization from Surface Soil	0.E+00	NA	NA	4.E-04	NA	NA
	Volatilization from Subsurface Soil	0.E+00	NA	NA	3.E-04	NA	NA
	Volatilization from Surface and Subsurface Soil	NA	0.E+00	NA	NA	2.E-05	NA
	Volatilization from Groundwater	6.E-09	NA	1.E-07	1.E-03	NA	1.E-02
	<b>Outdoor Air Total<sup>1</sup></b>	<b>6.E-09</b>	<b>7.E-13</b>	<b>1.E-07</b>	<b>1.E-03</b>	<b>2.E-05</b>	<b>1.E-02</b>
	Indoor Air						
	Volatilization from Soil	0.E+00	NA	NA	2.E-03	NA	NA
	Volatilization from Groundwater	3.E-08	NA	NA	7.E-03	NA	NA
	<b>Indoor Air Total<sup>2</sup></b>	<b>3.E-08</b>	<b>NA</b>	<b>NA</b>	<b>7.E-03</b>	<b>NA</b>	<b>NA</b>
	<b>TOTAL AIR<sup>3</sup></b>	<b>3.E-08</b>	<b>7.E-13</b>	<b>1.E-07</b>	<b>7.E-03</b>	<b>2.E-05</b>	<b>1.E-02</b>
Groundwater Pathways	Inhalation of Volatiles and Dermal Contact with Groundwater	NA	1.E-07	NA	NA	3.E-01	NA
	Dermal Contact with Groundwater (metals)	NA	2.E-09	NA	NA	1.E-05	NA
<b>TOTALS</b>		<b>2.E-07</b>	<b>1.E-07</b>	<b>1.E-07</b>	<b>9.E-03</b>	<b>3.E-01</b>	<b>1.E-02</b>

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Notes:

- (1) Sum of risks/hazards from fugitive dust plus volatilization from soil or groundwater, whichever is greater.  
(2) Volatilization from soil or groundwater, whichever is greater.  
(3) Taken as the greater of Outdoor or Indoor Air Total, as applicable.  
Shaded boxes indicate COPC that exceeds DEQ acceptable target risk level or target hazard index.

Acronyms:

SVOCs = Semivolatile Organic Compounds.  
VOCs = Volatile Organic Compounds.  
NA = Not Available.  
NE = Not Evaluated (only volatile compounds evaluated).

**Table 20 - KMLT RME Risk and Hazard Summary: By COPC**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

Exposure Scenario	COPC	RME Cancer Risk					
		Soil Ingestion	Dermal Contact with Soil	Inhalation of Dust	Outdoor: Inhalation of VOCs from Soil	Inhalation of VOCs and Dermal Contact with Groundwater	TOTAL
Site Worker	Benzo(a)anthracene	8.E-07	3.E-07	4.E-11	na	na	1.E-06
	Benzo(a)pyrene	6.E-06	3.E-06	3.E-10	na	na	9.E-06
	Arsenic	6.E-06	5.E-07	3.E-09	na	na	6.E-06
	<b>TOTAL</b>	<b>1.E-05</b>	<b>4.E-06</b>	<b>3.E-09</b>	<b>0.E+00</b>	<b>0.E+00</b>	<b>2.E-05</b>

Exposure Scenario	COPC	RME Hazard Index					
		Soil Ingestion	Dermal Contact with Soil	Inhalation of Dust	Outdoor: Inhalation of VOCs from Soil	Inhalation of VOCs and Dermal Contact with Groundwater	TOTAL
Trench Worker	1,2,4-Trimethylbenzene	2.E-06	na	8.E-10	5.E-05	1.E+00	1.E+00
	1,3,5-Trimethylbenzene	1.E-06	na	6.E-10	1.E-04	1.E-01	1.E-01
	Benzene	na	na	na	na	1.E-01	1.E-01
	Naphthalene	8.E-06	6.E-06	3.E-09	9.E-05	1.E-01	1.E-01
	2-Methylnaphthalene	na	na	na	na	2.E-01	2.E-01
	<b>TOTAL</b>	<b>1.E-05</b>	<b>6.E-06</b>	<b>4.E-09</b>	<b>3.E-04</b>	<b>2.E+00</b>	<b>2.E+00</b>

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**Notes:**

Shaded boxes indicate COPC that exceeds DEQ acceptable target risk level or target hazard index.

na = not applicable

**Table 21 - ChevronTexaco Human Health Risk and Hazard Summary: By Exposure Pathway**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

**Reasonable Maximum Exposure**

Exposure Pathways		RISK SUMMARY			HAZARD SUMMARY		
		Industrial Worker	Trench Worker	Landscape Worker	Industrial Worker	Trench Worker	Landscape Worker
Soil Pathways	Ingestion	1.E-08	6.E-09	NA	1.E-02	1.E-03	NE
	Dermal Contact	6.E-07	4.E-09	NA	3.E-04	7.E-05	NE
	<b>TOTAL SOIL</b>	<b>2.E-06</b>	<b>1.E-08</b>	<b>NA</b>	<b>1.E-02</b>	<b>1.E-03</b>	<b>NE</b>
Air Pathways	Outdoor Air						
	Fugitive Dust	2.E-08	3.E-11	NA	4.E-05	2.E-06	NA
	Volatilization from Surface Soil	0.E+00	NA	NA	1.E-02	NA	NA
	Volatilization from Subsurface Soil	0.E+00	NA	NA	3.E-05	NA	NA
	Volatilization from Surface and Subsurface Soil	NA	0.E+00	NA	NA	4.E-04	NA
	Volatilization from Groundwater	6.E-07	NE	1.E-07	8.E-03	NE	1.E-03
	<b>Outdoor Air Total<sup>1</sup></b>	<b>6.E-07</b>	<b>3.E-11</b>	<b>1.E-07</b>	<b>1.E-02</b>	<b>4.E-04</b>	<b>1.E-03</b>
	Indoor Air						
	Volatilization from Soil	0.E+00	NA	NA	7.E-03	NA	NA
	Volatilization from Groundwater	3.E-06	NA	NA	4.E-02	NA	NA
	<b>Indoor Air Total<sup>2</sup></b>	<b>3.E-06</b>	<b>NA</b>	<b>NA</b>	<b>4.E-02</b>	<b>NA</b>	<b>NA</b>
	<b>TOTAL AIR<sup>3</sup></b>	<b>3.E-06</b>	<b>3.E-11</b>	<b>1.E-07</b>	<b>4.E-02</b>	<b>4.E-04</b>	<b>1.E-03</b>
	Inhalation of Volatiles and Dermal Contact with Groundwater (SVOCs and VOCs)	NA	7.E-06	NA	NA	4.E-01	NA
	Dermal Contact with Groundwater (metals)	NA	4.E-09	NA	NA	2.E-04	NA
<b>TOTALS</b>		<b>5.E-06</b>	<b>7.E-06</b>	<b>1.E-07</b>	<b>5.E-02</b>	<b>4.E-01</b>	<b>1.E-03</b>

**Central Tendency Exposure**

Exposure Pathways		RISK SUMMARY			HAZARD SUMMARY		
		Industrial Worker	Trench Worker	Landscape Worker	Industrial Worker	Trench Worker	Landscape Worker
Soil Pathways	Ingestion	2.E-08	2.E-10	NA	9.E-04	6.E-05	NA
	Dermal Contact	4.E-09	2.E-10	NA	1.E-05	4.E-06	NA
	<b>TOTAL SOIL</b>	<b>3.E-08</b>	<b>4.E-10</b>	<b>NA</b>	<b>9.E-04</b>	<b>7.E-05</b>	<b>NA</b>
Air Pathways	Outdoor Air						
	Fugitive Dust	8.E-10	5.E-12	NA	7.E-06	3.E-07	NA
	Volatilization from Surface Soil	0.E+00	NA	NA	4.E-04	NA	NA
	Volatilization from Subsurface Soil	0.E+00	NA	NA	3.E-05	NA	NA
	Volatilization from Surface and Subsurface Soil	NA	0.E+00	NA	NA	1.E-05	NA
	Volatilization from Groundwater	1.E-08	NA	3.E-08	6.E-04	NA	1.E-03
	<b>Outdoor Air Total<sup>1</sup></b>	<b>1.E-08</b>	<b>5.E-12</b>	<b>3.E-08</b>	<b>6.E-04</b>	<b>1.E-05</b>	<b>1.E-03</b>
	Indoor Air						
	Volatilization from Soil	0.E+00	NA	NA	1.E-03	NA	NA
	Volatilization from Groundwater	6.E-08	NA	NA	3.E-03	NA	NA
	<b>Indoor Air Total<sup>2</sup></b>	<b>6.E-08</b>	<b>NA</b>	<b>NA</b>	<b>3.E-03</b>	<b>NA</b>	<b>NA</b>
	<b>TOTAL AIR<sup>3</sup></b>	<b>6.E-08</b>	<b>5.E-12</b>	<b>3.E-08</b>	<b>3.E-03</b>	<b>1.E-05</b>	<b>1.E-03</b>
	Inhalation of Volatiles and Dermal Contact with Groundwater	NA	6.E-07	NA	NA	6.E-02	NA
	Dermal Contact with Groundwater (metals)	NA	2.E-09	NA	NA	7.E-05	NA
<b>TOTALS</b>		<b>8.E-08</b>	<b>6.E-07</b>	<b>3.E-08</b>	<b>4.E-03</b>	<b>6.E-02</b>	<b>1.E-03</b>

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**Notes:**

- (1) Sum of risks/hazards from fugitive dust plus volatilization from soil or groundwater, whichever is greater.  
(2) Volatilization from soil or groundwater, whichever is greater.  
(3) Taken as the greater of Outdoor or Indoor Air Total, as applicable.

**Acronyms:**

SVOCs = Semivolatile Organic Compounds.  
VOCs = Volatile Organic Compounds.  
NA = Not Available.  
NE = Not Evaluated (only volatile compounds evaluated).

Table 22 - ChevronTexaco RME Risk and Hazard Summary: By COPC  
Willbridge Terminal Risk Assessment  
Portland, Oregon

Exposure Scenario	COPC	RME Cancer Risk							TOTAL
		Soil Ingestion	Dermal Contact with Soil	Inhalation of Dust	Indoor: Inhalation of VOCs from Groundwater	Outdoor: Inhalation of VOCs from Soil	Outdoor: Inhalation of VOCs from Groundwater	Inhalation of VOCs and Dermal Contact with Groundwater	
Site Worker (entire site)	Benzo(a)pyrene	5.E-07	2.E-07	3.E-11	na	na	na	na	7.E-07
	Dibenz(a,h)anthracene	7.E-07	3.E-07	3.E-11	na	na	na	na	9.E-07
	Benzene	na	na	na	3.E-06	na	6.E-07	na	4.E-06
	<b>TOTAL</b>	<b>1.E-06</b>	<b>5.E-07</b>	<b>6.E-11</b>	<b>3.E-06</b>	<b>0.E+00</b>	<b>6.E-07</b>	<b>0.E+00</b>	<b>5.E-06</b>
Site Worker (Non-Chevron Ethanol Area)	Benzo(a)pyrene	5.E-07	2.E-07	3.E-11	na	na	na	na	7.E-07
	Dibenz(a,h)anthracene	7.E-07	3.E-07	3.E-11	na	na	na	na	9.E-07
	Benzene	na	na	na	1.E-07	na	3.E-08	na	2.E-07
	<b>TOTAL</b>	<b>1.E-06</b>	<b>5.E-07</b>	<b>6.E-11</b>	<b>1.E-07</b>	<b>0.E+00</b>	<b>3.E-08</b>	<b>0.E+00</b>	<b>2.E-06</b>
Site Worker (Chevron Ethanol Area)	Benzo(a)pyrene	5.E-07	2.E-07	3.E-11	na	na	na	na	7.E-07
	Dibenz(a,h)anthracene	7.E-07	3.E-07	3.E-11	na	na	na	na	9.E-07
	Benzene	na	na	na	5.E-06	na	1.E-06	na	6.E-06
	<b>TOTAL</b>	<b>1.E-06</b>	<b>5.E-07</b>	<b>6.E-11</b>	<b>5.E-06</b>	<b>0.E+00</b>	<b>1.E-06</b>	<b>0.E+00</b>	<b>8.E-06</b>

Exposure Scenario	COPC	RME Cancer Risk							TOTAL
		Soil Ingestion	Dermal Contact with Soil	Inhalation of Dust	Indoor: Inhalation of VOCs from Groundwater	Outdoor: Inhalation of VOCs from Soil	Outdoor: Inhalation of VOCs from Groundwater	Inhalation of VOCs and Dermal Contact with Groundwater	
Trench Worker (entire site)	Benzo(a)pyrene	2.E-09	2.E-09	3.E-14	na	na	na	1.E-06	1.E-06
	Benzo(b)fluoranthene	2.E-10	2.E-10	4.E-15	na	na	na	1.E-07	1.E-07
	Indeno(1,2,3-cd)pyrene	6.E-10	5.E-10	1.E-14	na	na	na	2.E-07	2.E-07
	Benzene	na	na	na	na	na	na	5.E-06	5.E-06
	<b>TOTAL</b>	<b>3.E-09</b>	<b>2.E-09</b>	<b>5.E-14</b>	<b>0.E+00</b>	<b>0.E+00</b>	<b>0.E+00</b>	<b>7.E-06</b>	<b>7.E-06</b>
Trench Worker (Non-Chevron Ethanol Area)	Benzo(a)pyrene	2.E-09	2.E-09	3.E-14	na	na	na	3.E-06	3.E-06
	Benzo(b)fluoranthene	2.E-10	2.E-10	4.E-15	na	na	na	1.E-07	1.E-07
	Indeno(1,2,3-cd)pyrene	6.E-10	5.E-10	1.E-14	na	na	na	1.E-07	1.E-07
	Benzene	na	na	na	na	na	na	2.E-07	2.E-07
	<b>TOTAL</b>	<b>3.E-09</b>	<b>2.E-09</b>	<b>5.E-14</b>	<b>0.E+00</b>	<b>0.E+00</b>	<b>0.E+00</b>	<b>4.E-06</b>	<b>4.E-06</b>
Trench Worker (Chevron Ethanol Area)	Benzo(a)pyrene	2.E-09	2.E-09	3.E-14	na	na	na	8.E-06	8.E-06
	Benzo(b)fluoranthene	2.E-10	2.E-10	4.E-15	na	na	na	6.E-07	6.E-07
	Indeno(1,2,3-cd)pyrene	6.E-10	5.E-10	1.E-14	na	na	na	4.E-07	4.E-07
	Benzene	na	na	na	na	na	na	9.E-06	9.E-06
	<b>TOTAL</b>	<b>3.E-09</b>	<b>2.E-09</b>	<b>5.E-14</b>	<b>0.E+00</b>	<b>0.E+00</b>	<b>0.E+00</b>	<b>2.E-05</b>	<b>2.E-05</b>

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**Notes:**

Shaded boxes indicate COPC that exceeds DEQ acceptable target risk level or target hazard index.

na = Not applicable.

COP0020583

Table 23 - ConocoPhillips Human Health Risk and Hazard Summary: By Exposure Pathway  
Willbridge Terminal Risk Assessment  
Portland, Oregon

Reasonable Maximum Exposure

Exposure Pathways		RISK SUMMARY		HAZARD SUMMARY	
		Industrial Worker	Trench Worker	Industrial Worker	Trench Worker
Soil Pathways	Ingestion	9.E-07	2.E-09	7.E-03	9.E-04
	Dermal Contact	4.E-07	1.E-09	0.E+00	0.E+00
	<b>TOTAL SOIL</b>	<b>1.E-06</b>	<b>3.E-09</b>	<b>7.E-03</b>	<b>9.E-04</b>
Air Pathways	<b>Outdoor Air</b>				
	Fugitive Dust	1.E-08	2.E-11	7.E-05	2.E-06
	Volatilization from Surface Soil	6.E-08	NA	1.E-03	NA
	Volatilization from Subsurface Soil	6.E-09	NA	2.E-04	NA
	Volatilization from Surface and Subsurface Soil	NA	3.E-11	NA	3.E-05
	Volatilization from Groundwater	6.E-09	NE	5.E-04	NE
	<b>Outdoor Air Total<sup>1</sup></b>	<b>8.E-08</b>	<b>5.E-11</b>	<b>2.E-03</b>	<b>4.E-05</b>
	<b>Indoor Air</b>				
	Volatilization from Soil	1.E-07	NA	2.E-03	NA
	Volatilization from Groundwater	3.E-08	NA	3.E-03	NA
	<b>Indoor Air Total<sup>2</sup></b>	<b>3.E-08</b>	<b>NA</b>	<b>3.E-03</b>	<b>NA</b>
	<b>TOTAL AIR<sup>3</sup></b>	<b>8.E-08</b>	<b>5.E-11</b>	<b>3.E-03</b>	<b>4.E-05</b>
Groundwater Pathways	Inhalation of Volatiles and Dermal Contact with Groundwater (SVOCs and VOCs)	NA	2.E-06	NA	1.E-01
	Dermal Contact with Groundwater (metals)	NA	2.E-08	NA	5.E-04
<b>TOTALS</b>		<b>1.E-06</b>	<b>2.E-06</b>	<b>1.E-02</b>	<b>1.E-01</b>

Central Tendency Exposure

Exposure Pathways		RISK SUMMARY		HAZARD SUMMARY	
		Industrial Worker	Trench Worker	Industrial Worker	Utility Worker
Soil Pathways	Ingestion	9.E-09	7.E-11	7.E-04	5.E-05
	Dermal Contact	1.E-09	6.E-11	0.E+00	0.E+00
	<b>TOTAL SOIL</b>	<b>1.E-08</b>	<b>1.E-10</b>	<b>7.E-04</b>	<b>5.E-05</b>
Air Pathways	<b>Outdoor Air</b>				
	Fugitive Dust	7.E-10	4.E-12	1.E-05	5.E-07
	Volatilization from Surface Soil	6.E-10	NA	4.E-05	NA
	Volatilization from Subsurface Soil	3.E-09	NA	4.E-05	NA
	Volatilization from Surface and Subsurface Soil	NA	5.E-12	NA	2.E-06
	Volatilization from Groundwater	9.E-10	NA	1.E-04	NA
	<b>Outdoor Air Total<sup>1</sup></b>	<b>4.E-09</b>	<b>8.E-12</b>	<b>1.E-04</b>	<b>2.E-06</b>
	<b>Indoor Air</b>				
	Volatilization from Soil	5.E-08	NA	7.E-04	NA
	Volatilization from Groundwater	5.E-09	NA	7.E-04	NA
	<b>Indoor Air Total<sup>2</sup></b>	<b>5.E-09</b>	<b>NA</b>	<b>7.E-04</b>	<b>NA</b>
	<b>TOTAL AIR<sup>3</sup></b>	<b>5.E-09</b>	<b>8.E-12</b>	<b>7.E-04</b>	<b>2.E-06</b>
Groundwater Pathways	Inhalation of Volatiles and Dermal Contact with Groundwater	NA	2.E-07	NA	4.E-02
	Dermal Contact with Groundwater (metals)	NA	5.E-09	NA	8.E-05
<b>TOTALS</b>		<b>1.E-08</b>	<b>2.E-07</b>	<b>1.E-03</b>	<b>4.E-02</b>

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Notes:

(1) Sum of risks/hazards from fugitive dust plus volatilization from soil or groundwater, whichever is greater.

(2) Volatilization from soil or groundwater, whichever is greater.

(3) Taken as the greater of Outdoor or Indoor Air Total, as applicable.

Acronyms:

SVOCs = Semivolatile Organic Compounds.

VOCs = Volatile Organic Compounds.

NA = Not Available.

NE = Not Evaluated (only volatile compounds evaluated).

**Table 24 - Willbridge Facility Utility Worker Human Health Risk and Hazard Summary: By Exposure Pathway**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

**Reasonable Maximum Exposure**

Exposure Pathways		RISK SUMMARY Utility Worker	HAZARD SUMMARY Utility Worker
Soil Pathways	Ingestion	2.E-08	3.E-03
	Dermal Contact	2.E-09	5.E-07
	<b>TOTAL SOIL</b>	<b>2.E-08</b>	<b>3.E-03</b>
Air Pathways	<b>Outdoor Air</b>		
	Fugitive Dust	3.E-11	1.E-06
	Volatilization from Surface Soil	NA	NA
	Volatilization from Subsurface Soil	NA	NA
	Volatilization from Surface and Subsurface Soil	0.E+00	7.E-05
	Volatilization from Groundwater	NE	NE
	<b>Outdoor Air Total<sup>1</sup></b>	<b>3.E-11</b>	<b>7.E-05</b>
	<b>Indoor Air</b>		
	Volatilization from Soil	NA	NA
	Volatilization from Groundwater	NA	NA
	<b>Indoor Air Total<sup>2</sup></b>	<b>NA</b>	<b>NA</b>
	<b>TOTAL AIR<sup>3</sup></b>	<b>3.E-11</b>	<b>7.E-05</b>
Groundwater Pathways	Inhalation of Volatiles and Dermal Contact with Groundwater (SVOCs and VOCs)	1.E-06	3.E-01
	Dermal Contact with Groundwater (metals)	2.E-08	1.E-03
<b>TOTALS</b>		<b>1.E-06</b>	<b>3.E-01</b>

**Central Tendency Exposure**

Exposure Pathways		RISK SUMMARY Utility Worker	HAZARD SUMMARY Utility Worker
Soil Pathways	Ingestion	7.E-10	2.E-04
	Dermal Contact	8.E-11	8.E-09
	<b>TOTAL SOIL</b>	<b>8.E-10</b>	<b>2.E-04</b>
Air Pathways	<b>Outdoor Air</b>		
	Fugitive Dust	6.E-12	3.E-07
	Volatilization from Surface Soil	NA	NA
	Volatilization from Subsurface Soil	NA	NA
	Volatilization from Surface and Subsurface Soil	0.E+00	1.E-06
	Volatilization from Groundwater	NA	NA
	<b>Outdoor Air Total<sup>1</sup></b>	<b>6.E-12</b>	<b>1.E-06</b>
	<b>Indoor Air</b>		
	Volatilization from Soil	NA	NA
	Volatilization from Groundwater	NA	NA
	<b>Indoor Air Total<sup>2</sup></b>	<b>NA</b>	<b>NA</b>
	<b>TOTAL AIR<sup>3</sup></b>	<b>6.E-12</b>	<b>1.E-06</b>
Groundwater Pathways	Inhalation of Volatiles and Dermal Contact with Groundwater	6.E-07	7.E-02
	Dermal Contact with Groundwater (metals)	2.E-09	7.E-05
<b>TOTALS</b>		<b>6.E-07</b>	<b>7.E-02</b>

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**Notes:**

- (1) Sum of risks/hazards from fugitive dust plus volatilization from soil or groundwater, whichever is greater.  
(2) Volatilization from soil or groundwater, whichever is greater.  
(3) Taken as the greater of Outdoor or Indoor Air Total, as applicable.

**Acronyms:**

SVOCs = Semivolatile Organic Compounds.  
VOCs = Volatile Organic Compounds.  
NA = Not Available.  
NE = Not Evaluated (only volatile compounds evaluated).

**Table 25 - KMLT Ecological Exposure Point Concentrations: Soil  
Willbridge Terminal Risk Assessment  
Portland, Oregon**

Analyte	Detection Frequency	SQL Range (Min-Max)	Detect Range (Min-Max)	Sample ID of Maximum Detection	Maximum	Arithmetic Mean
<b>KMLT: Level II ERA, Surface Soil (0 to 3 feet bgs)</b>						
<b>SVOCs in mg/kg</b>						
Benzo(a)anthracene	3/5	0.0067	0.0273 - 0.0872	G-RF-4(2.5)	8.72E-02	3.87E-02
Benzo(a)pyrene	3/5	0.0067	0.0412 - 0.119	G-RF-4(2.5)	1.19E-01	4.83E-02
Benzo(b)fluoranthene	3/5	0.0067	0.0329 - 0.124	G-RF-4(2.5)	1.24E-01	4.27E-02
Benzo(g,h,i)perylene	3/5	0.0067	0.0346 - 0.0899	G-RF-4(2.5)	8.99E-02	3.57E-02
Benzo(k)fluoranthene	3/5	0.0067	0.0227 - 0.0674	G-RF-4(2.5)	6.74E-02	2.53E-02
Chrysene	3/5	0.0067	0.0272 - 0.107	G-RF-4(2.5)	1.07E-01	4.52E-02
Indeno(1,2,3-cd)pyrene	3/5	0.0067	0.0238 - 0.0679	G-RF-4(2.5)	6.79E-02	2.64E-02
Pyrene	3/5	0.0067	0.0668 - 0.191	G-RF-4(2.5)	1.91E-01	7.06E-02

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**Acronyms and Abbreviations:**

SQL = Standard quantification limit.

Min = Minimum.

Max = Maximum.

bgs = Below ground surface.



**Table 26 - Level II Screening Table: KMLT OU Soil**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

	Soil (Concentrations in mg/kg (ppm))						Soil (Concentrations in mg/kg (ppm))						Soil (Concentrations in mg/kg (ppm))						Soil (Concentrations in mg/kg (ppm))					
	Plant SLV	EC	Tj	CPEC?	Tj/Tj	CPEC?	Inverts SLV	EC	Tj	CPEC?	Tj/Tj	CPEC?	Birds SLV	EC	Tj	CPEC?	Tj/Tj	CPEC?	Mammals SLV	EC	Tj	CPEC?	Tj/Tj	CPEC?
Semivolatiles																								
Acenaphthene	1.0E+02	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No
Acenaphthylene	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No
Anthracene	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No
Benzo(a)anthracene	NA	8.7E-02	--	Yes	--	Yes	NA	8.7E-02	--	Yes	--	Yes	NA	8.7E-02	--	Yes	--	Yes	NA	8.7E-02	--	Yes	--	Yes
Benzo(a)pyrene	NA	1.2E-01	--	Yes	--	Yes	NA	1.2E-01	--	Yes	--	Yes	NA	1.2E-01	--	Yes	--	Yes	6.3E+02	1.2E-01	1.9E-04	No	1.0E+00	Yes
Benzo(b)fluoranthene	NA	1.2E-01	--	Yes	--	Yes	NA	1.2E-01	--	Yes	--	Yes	NA	1.2E-01	--	Yes	--	Yes	NA	1.2E-01	--	Yes	--	Yes
Benzo(g,h,i)perylene	NA	3.6E-02	--	Yes	--	Yes	NA	3.6E-02	--	Yes	--	Yes	NA	3.6E-02	--	Yes	--	Yes	NA	3.6E-02	--	Yes	--	Yes
Benzo(k)fluoranthene	NA	6.7E-02	--	Yes	--	Yes	NA	6.7E-02	--	Yes	--	Yes	NA	6.7E-02	--	Yes	--	Yes	NA	6.7E-02	--	Yes	--	Yes
Chrysene	NA	1.0E-01	--	Yes	--	Yes	NA	1.0E-01	--	Yes	--	Yes	NA	1.0E-01	--	Yes	--	Yes	NA	1.0E-01	--	Yes	--	Yes
Dibenz(a,h)anthracene	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No
Fluoranthene	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No
Fluorene	NA	3.4E-03	--	No	--	No	1.5E+02	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No
Indeno(1,2,3-cd)pyrene	NA	9.9E-02	--	Yes	--	Yes	NA	9.9E-02	--	Yes	--	Yes	NA	4.2E-02	--	Yes	--	Yes	NA	4.2E-02	--	Yes	--	Yes
Naphthalene	5.0E+01	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	2.0E+04	3.4E-03	1.7E-07	No	9.0E-04	Yes
Phenanthrene	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No	NA	3.4E-03	--	No	--	No
Pyrene	NA	1.9E-01	--	Yes	--	Yes	NA	1.9E-01	--	Yes	--	Yes	NA	1.9E-01	--	Yes	--	Yes	NA	1.9E-01	--	Yes	--	Yes
Tj			0.0E+00						0.0E+00						0.0E+00						1.9E-04			
Nij			8.0E+00						8.0E+00						8.0E+00						8.0E+00			
1/Nij			1.3E-01						1.3E-01						1.3E-01						1.3E-01			

P261-262625502 - Willbridge Terminal Group - Risk Assessment Results - Risk Assessment Report 01 - Final Tables Tables 25-33

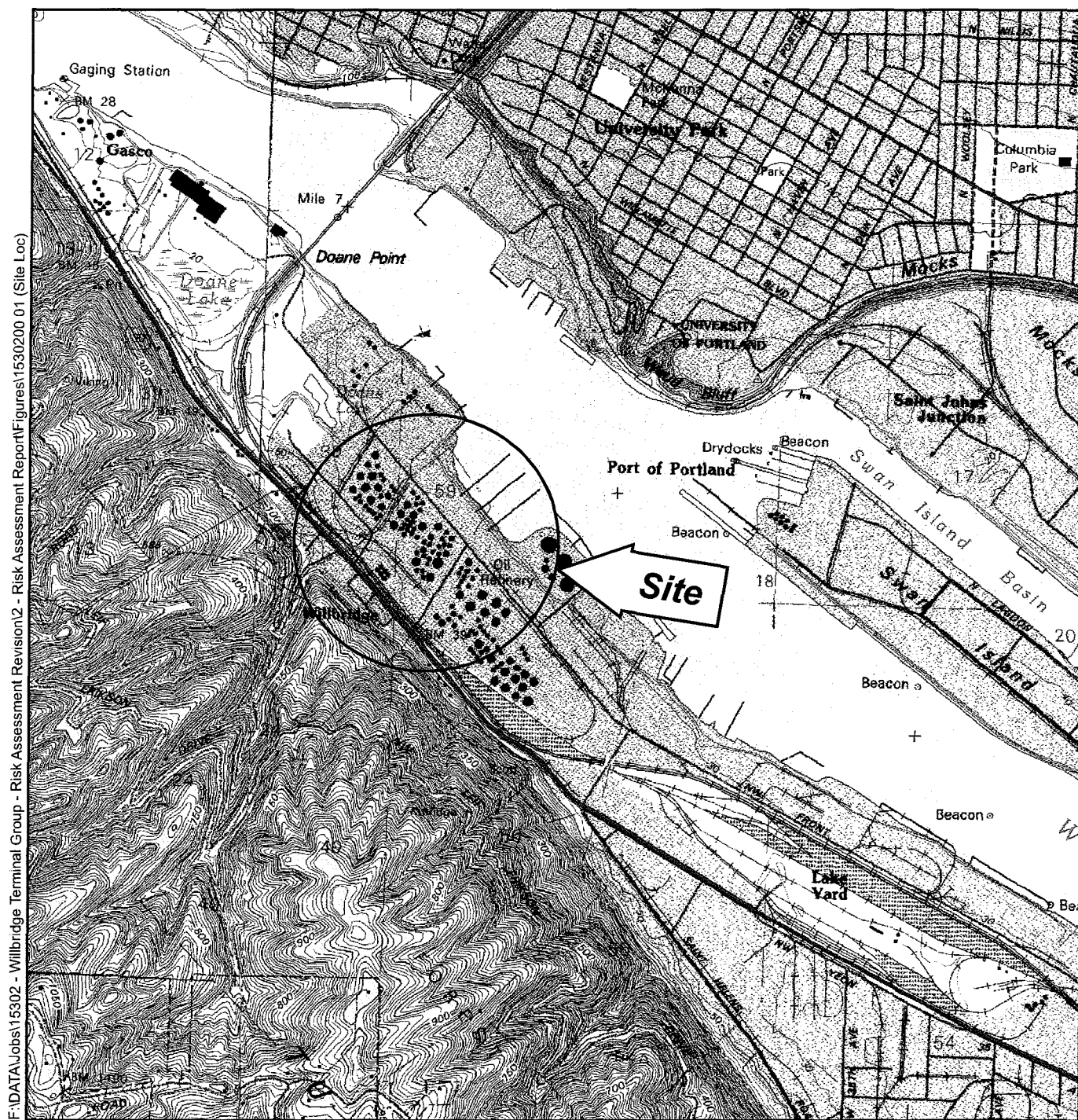
**Notes:**

1. SLV = DEQ Ecological Screening Level Value (December, 2001). The risk screening for soils used five times the SLV to identify CPECs.
2. EC = Environmental Concentration (one half the SOL was used for CO's not detected in these surface soil samples).
3. Tij = Risk ratio for compound i in medium j (ECi/SLVj); compound is a CPEC if Tij is greater than 1.
4. Tj = Sum of risk ratios for medium j.
5. Nij = Number of compounds i detected in medium j.
6. Tij/Tj = Compound is a CPEC if this ratio is greater than 1/Nij.
7. NA = Not available.
8. ND = Not detected.
9. mg/kg = milligrams per kilogram.
10. ppm = parts per million.

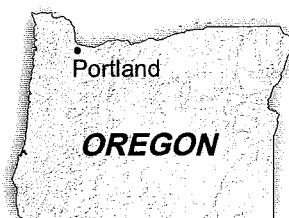
## **FIGURES**

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# **Site Location Map** **Willbridge Terminal Risk Assessment** **Portland, Oregon**



**Note:** Base map prepared from the USGS 7.5-minute quadrangle of Portland, Oregon, dated 1990.

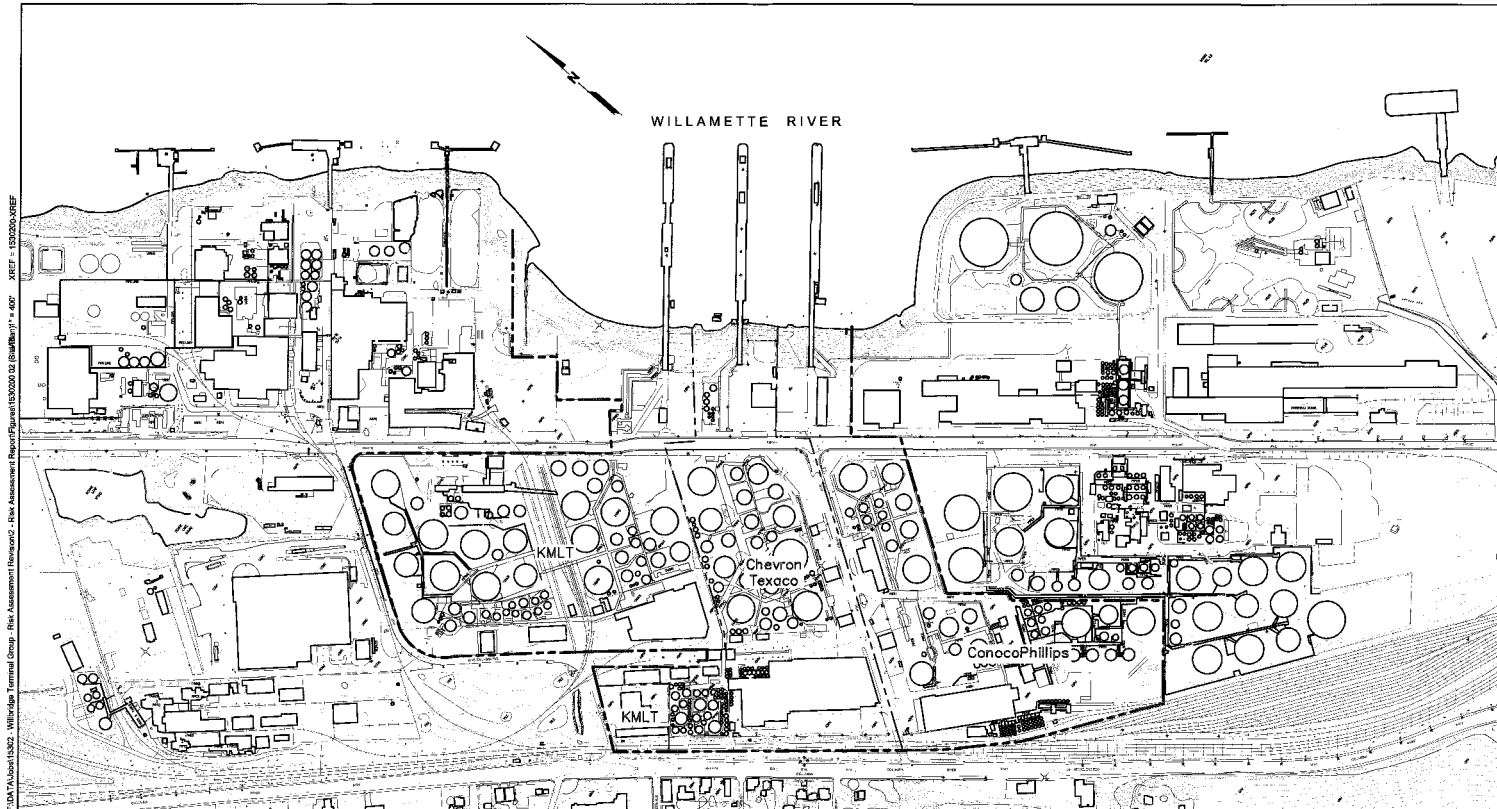


0 2,000 4,000  
 Scale in Feet  
 Contour Interval 10 Feet

**HARTCROWSER**  
 15302 6/03  
 Figure 1

COP0020589

**Site Plan**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**



E:\DATA\15302 Willbridge Terminal Risk Assessment Report\Figures\15302022 02 (Bulldozer) - 407 - JREF - 15302022.REF

Note: Base map prepared from a 2002 City of Portland AutoCAD file.

**Legend:**

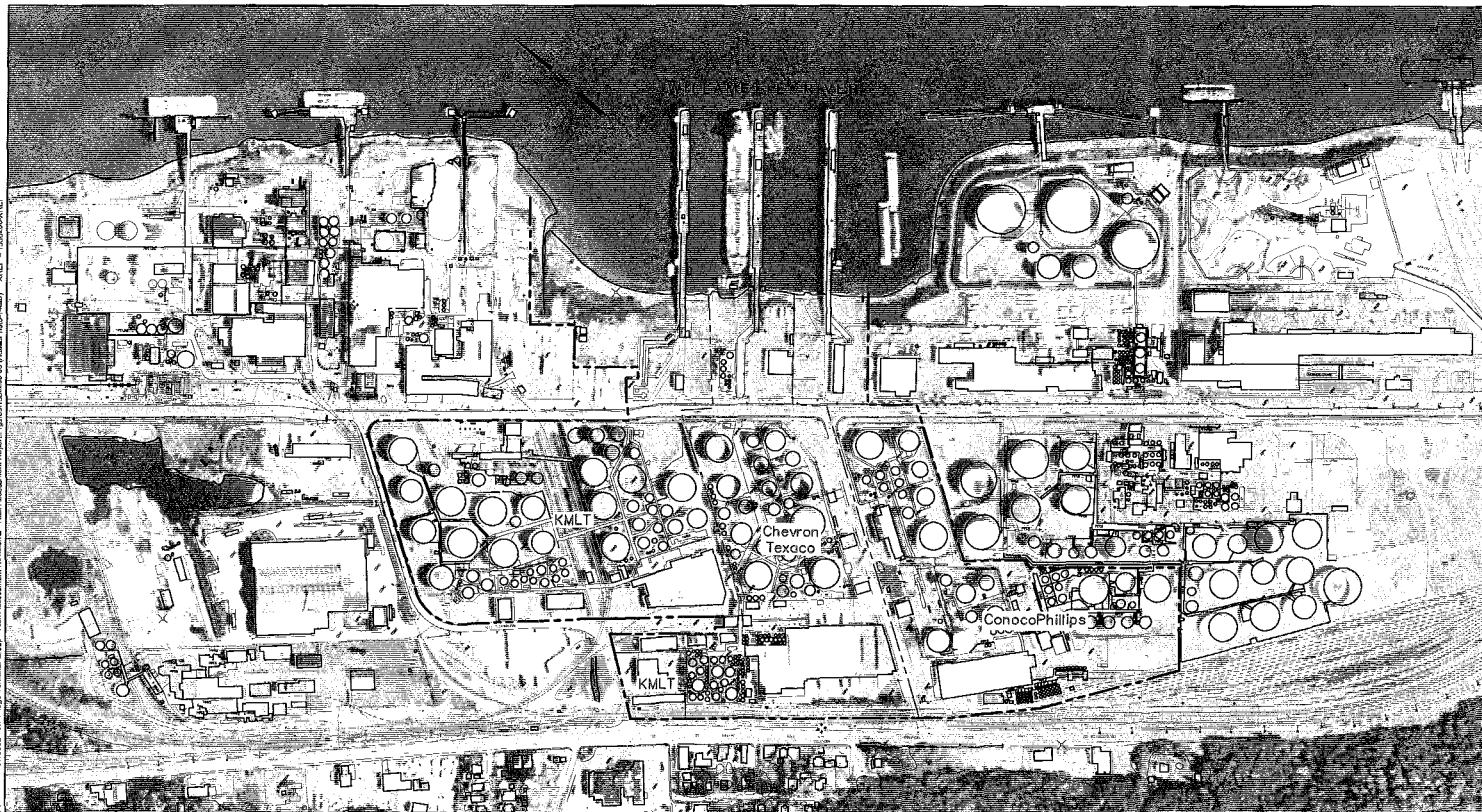
--- Site Boundary

0 400 800  
 Approximate Scale in Feet

**HARTCROWSER**  
 15302 6/03  
 Figure 2

COP0020590

**Aerial Photo Site Plan**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**



Note: Base map prepared from a 2002 City of Portland AutoCAD file

**Legend:**

--- Site Boundary

0 400 800  
 Approximate Scale in Feet

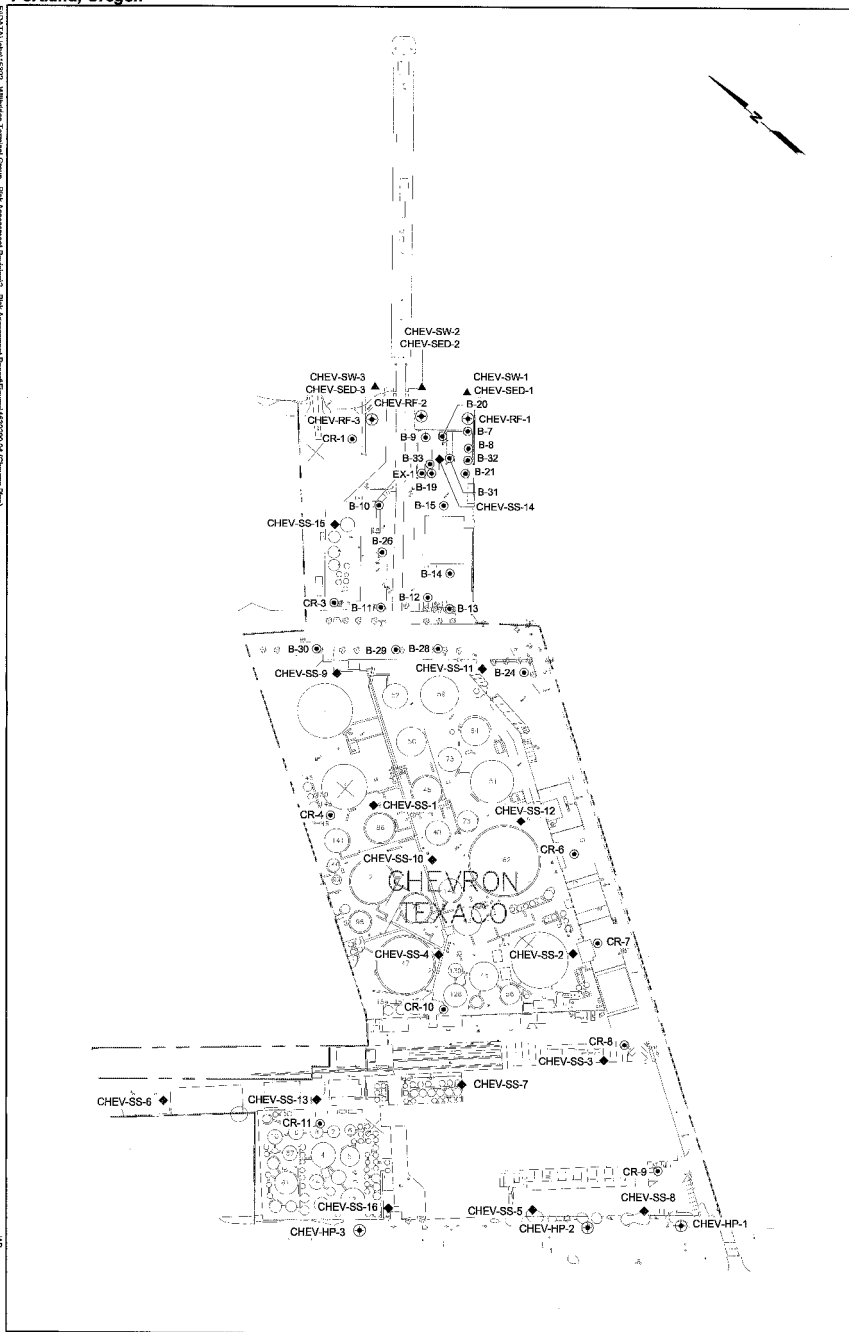
**HARTCROWSER**  
 15302  
 Figure 3  
 6/03

COP0020591

**Site Plan - Chevron Texaco OU  
Willbridge Terminal Risk Assessment  
Portland, Oregon**

15302 Willbridge Terminal Group - Risk Assessment Standard - Risk Assessment Report Figure 4 (Chevron Prop)

JAB



Note: Base map prepared from an AutoCAD provided by KIM/Delta Environmental, dated 2/2/99.

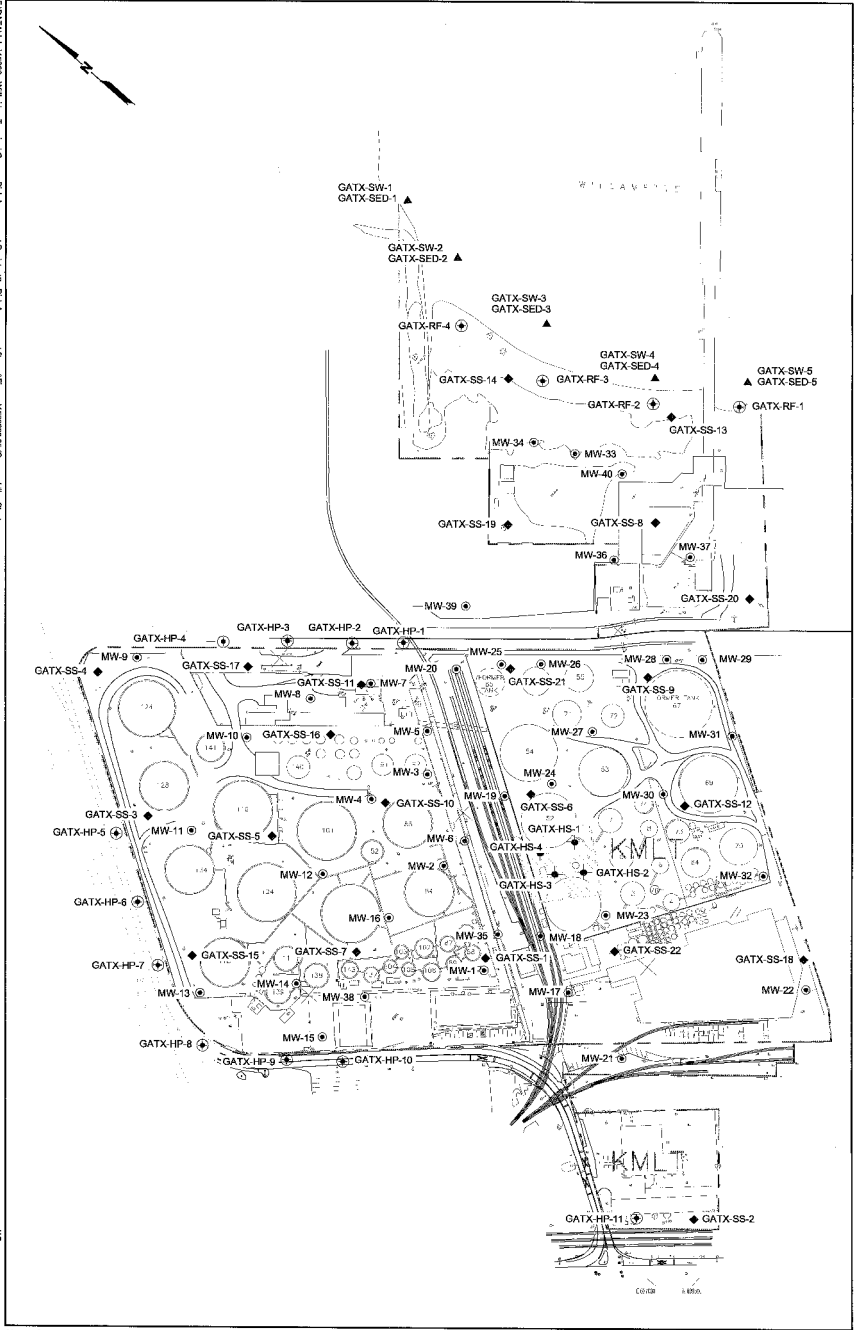
**Legend:**

- B-14 ● Monitoring Well Location and Number
- CHEV-SS-9 ◆ Surface Soil Sampling Location and Number
- CHEV-SED-3 ▲ River Sediment Sampling Location and Number
- CHEV-HP-3 ⊕ Hydropunch Location with Grounwater Location and Number

0 200 400  
Approximate Scale in Feet

**Site Plan - KMLT OU**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

15302 - Willbridge Terminal Group Risk Assessment Remediation - Risk Assessment Report/Figure 5 (02/20/10) (Conceptual Plan)



Note: Base map prepared from an AutoCAD provided by KHM/Delta Environmental, dated 2/2/99.

**Legend:**


- MW-34 ● Monitoring Well Location and Number
- GATX-SS-5 ◆ Surface Soil Sampling Location and Number
- GATX-SW-5 ▲ River Sediment Sampling Location and Number
- CHEV-HP-2 ⊕ Hydropunch Location with Groundwater Location and Number

0 200 400  
 Approximate Scale in Feet

PHILIP J. ALEXANDER, ISSCZ - Williambridge Terminal Group - Risk Assessment Unit  
Kovalevich - Risk Assessment Report (figures) 1504200 06 (Commodore Phil)



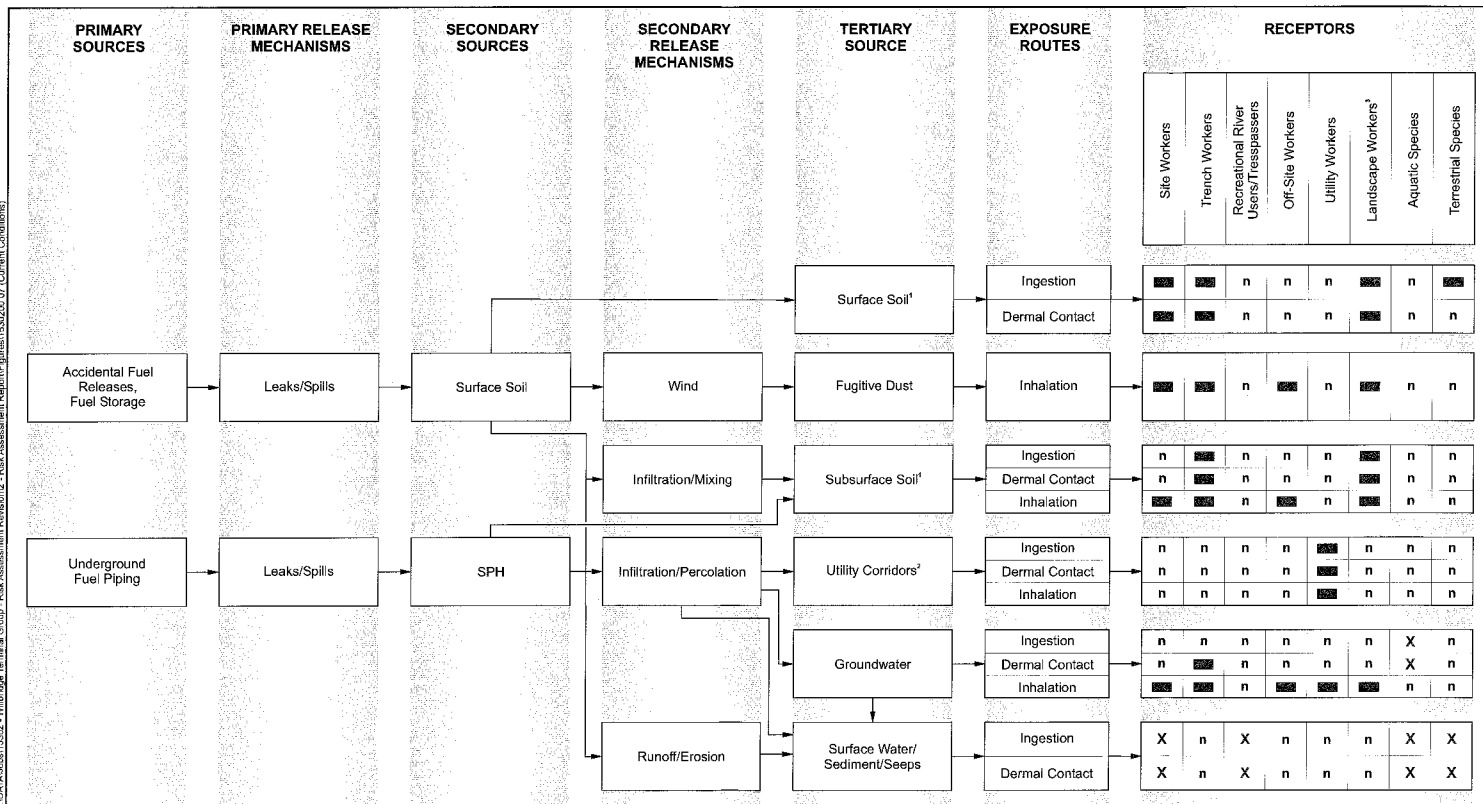
**Legend:**

- A-5  Chevron Asphalt Well Location and Number



**Conceptual Site Model - Current Conditions**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

E:\DATA\15302-Willbridge Terminal Group - Risk Assessment\Report\Figures\15302020\_07\_Conceptual Conditions



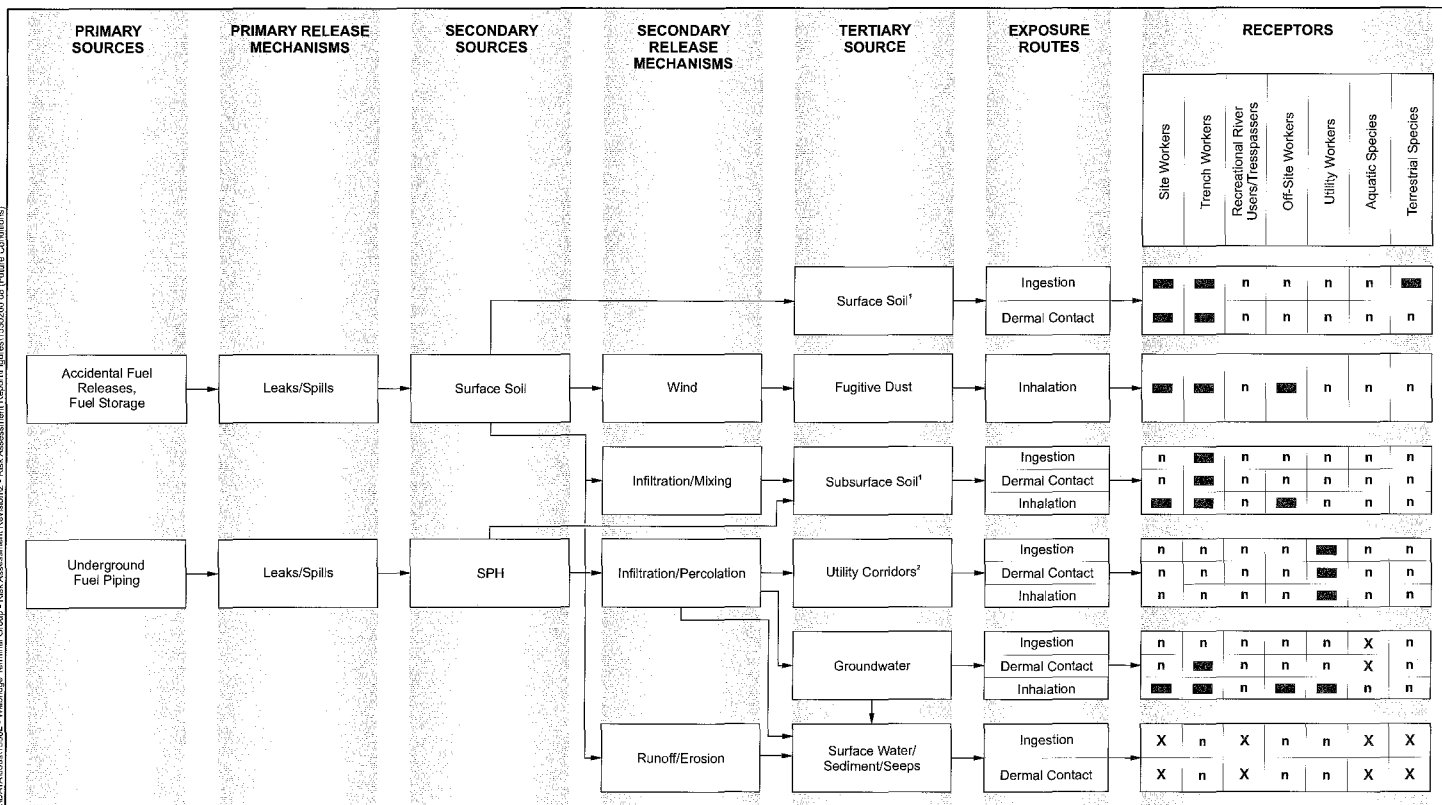
Notes: <sup>1</sup> Does Not Include Surface and Subsurface Soil in Utility Corridor Collected Outside of the Willbridge Facility <sup>2</sup> Includes Only Surface and Subsurface Soil in Utility Corridor: <sup>3</sup> Landscape Worker Will Only be Evaluated for Chevron Texaco and KMLT Facilities. Landscaping Activities are Complete at the ConocoPhillips Facility

**Legend:**

- Complete Exposure Pathway
- X Complete Exposure Pathway, Evaluation will be Completed in Conjunction with CERCLA Activities (See Sections 2.3.2 and 3.0 of Appendix for Further Discussion).
- n Incomplete or Insignificant Exposure Pathway
- SPH Separate-Phase Petroleum Hydrocarbons

**Conceptual Site Model - Future Conditions**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**

F:\DATA\15302 - Willbridge Terminal Group - Risk Assessment\Exhibit02 - Risk Assessment Report\Figures\1530200 (a) Future Conditions

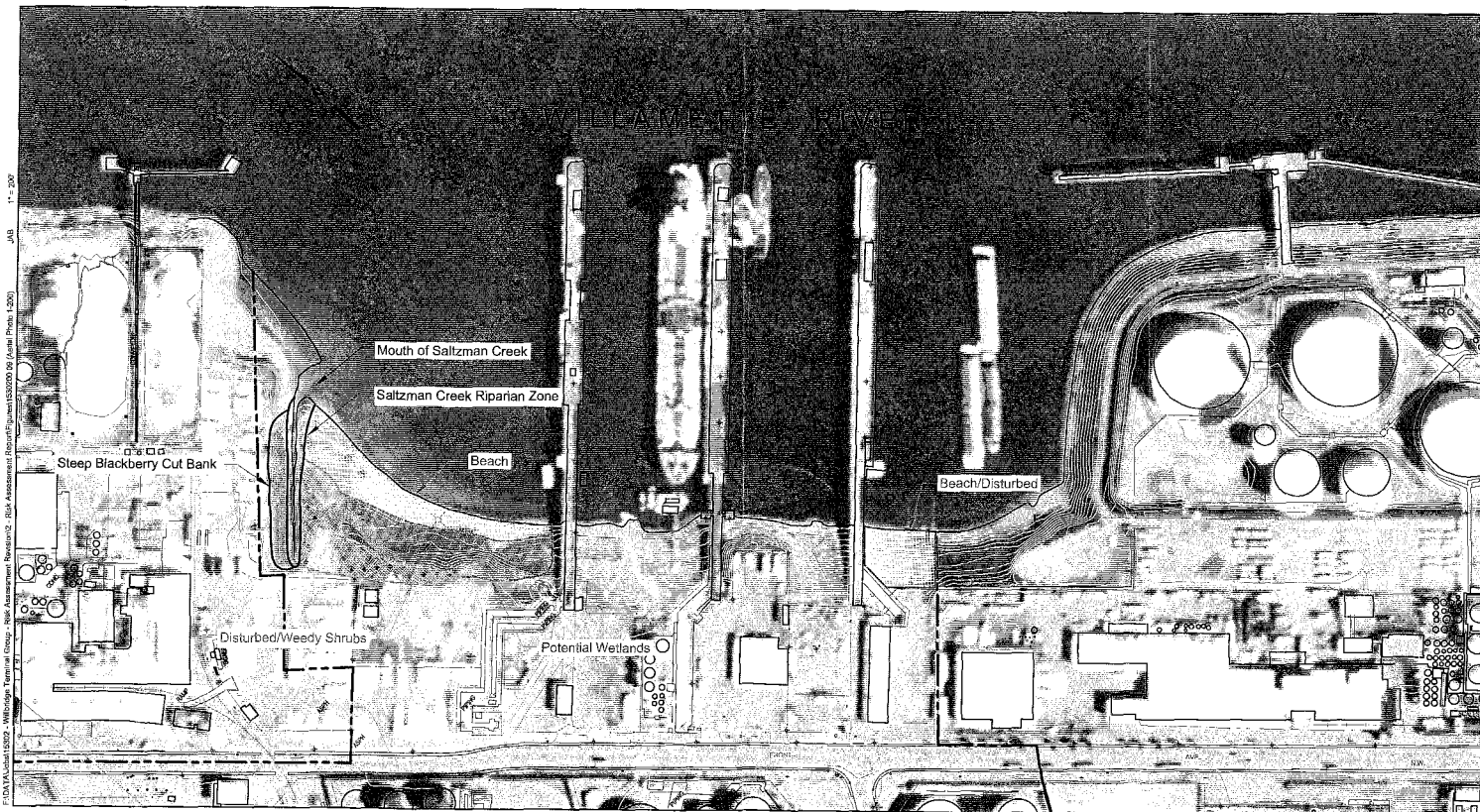


Notes: 1. Does Not Include Surface and Subsurface Soil in Utility Corridor Collected Outside of the Willbridge Facility. 2. Includes Only Surface and Subsurface Soil in Utility Corridor

**Legend:**

- Complete Exposure Pathway
- X** Complete Exposure Pathway, Evaluation will be Completed in Conjunction with CERCLA Activities (See Sections 2.3.2 and 3.0 of Appendix for Further Discussion).
- n** Incomplete or Insignificant Exposure Pathway
- SPH** Separate-Phase Petroleum Hydrocarbons

**Habitat Map**  
**Willbridge Terminal Risk Assessment**  
**Portland, Oregon**



Note: Base map prepared from a 2002 City of Portland AutoCAD file and Hart Crowser Field Reconnaissance.

**Legend:**

--- Site Boundary

**ATTACHMENT A**  
**ANALYTICAL DATA USED FOR RISK ASSESSMENTS**

**Table A-1 - Data Quality Evaluation of Soil Chemistry Results**  
**Willbridge Terminal - Kinder Morgan**

Hart Crowser  
J-15302

Date printed: 6/18/2003 Sheet 1 of 5

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Total Metals							
Arsenic	mg/kg	7/7	16.4	NA	1.6	0/0	7/7
Barium	mg/kg	7/7	249.0	NA	67000	0/0	0/7
Cadmium	mg/kg	5/7	1.1	0.5	450	0/2	0/5
Chromium	mg/kg	7/7	30.4	NA	64	0/0	0/7
Copper	mg/kg	7/7	46.3	NA	40900	0/0	0/7
Lead	mg/kg	6/7	142.0	10.0	750	0/1	0/6
Mercury	mg/kg	0/7	ND	0.05	310	0/7	0/0
Selenium	mg/kg	0/7	ND	0.5	5100	0/7	0/0
Silver	mg/kg	0/7	ND	2.5	5100	0/7	0/0
Zinc	mg/kg	7/7	387.0	NA	100000	0/0	0/7
Pesticides/PCBs							
4,4'-DDD	µg/kg	1/7	544.0	781.0	10000	0/6	0/1
4,4'-DDE	µg/kg	1/7	540.0	781.0	7000	0/6	0/1
4,4'-DDT	µg/kg	2/7	2090.0	781.0	7000	0/5	0/2
Aldrin	µg/kg	0/7	ND	781.0	100	2/7	0/0
Alpha-BHC	µg/kg	0/7	ND	781.0	360	1/7	0/0
Alpha-chlordane	µg/kg	0/7	ND	781.0	6470	0/7	0/0
Beta-BHC	µg/kg	0/7	ND	781.0	1300	0/7	0/0
Chlordane (tech)	µg/kg	0/7	ND	18800.0	6500	2/7	0/0
Delta-BHC	µg/kg	0/7	ND	781.0	NA	-	-
Dieldrin	µg/kg	0/7	ND	781.0	110	2/7	0/0
Endosulfan I	µg/kg	0/7	ND	781.0	3694000	0/7	0/0
Endosulfan II	µg/kg	0/7	ND	781.0	3694000	0/7	0/0
Endosulfan sulfate	µg/kg	0/7	ND	781.0	3694000	0/7	0/0
Endrin	µg/kg	0/7	ND	781.0	185000	0/7	0/0
Endrin aldehyde	µg/kg	0/7	ND	781.0	185000	0/7	0/0
Endrin ketone	µg/kg	0/7	ND	781.0	185000	0/7	0/0
Gamma-BHC (lindane)	µg/kg	0/7	ND	781.0	1700	0/7	0/0
Gamma-chlordane	µg/kg	0/7	ND	781.0	6470	0/7	0/0
Heptachlor	µg/kg	0/7	ND	781.0	380	1/7	0/0
Heptachlor epoxide	µg/kg	0/7	ND	781.0	190	2/7	0/0
Methoxychlor	µg/kg	0/7	ND	781.0	3078000	0/7	0/0
Toxaphene	µg/kg	0/7	ND	25000.0	1600	2/7	0/0
Semivolatiles							
2,4,5-Trichlorophenol	mg/kg	0/6	ND	25.0	61600	0/6	0/0

COP0020599

**Table A-1 - Data Quality Evaluation of Soil Chemistry  
Results  
Willbridge Terminal - Kinder Morgan**

Hart Crowser  
J-15302

Date printed: 6/18/2003 Sheet 2 of 5

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
2,4,6-Trichlorophenol	mg/kg	0/6	ND	25.0	62	0/6	0/0
2,4-Dichlorophenol	mg/kg	0/6	ND	25.0	1800	0/6	0/0
2,4-Dimethylphenol	mg/kg	0/6	ND	50.0	12300	0/6	0/0
2,4-Dinitrophenol	mg/kg	0/6	ND	100.0	1200	0/6	0/0
2,4-Dinitrotoluene	mg/kg	0/6	ND	25.0	1200	0/6	0/0
2,6-Dinitrotoluene	mg/kg	0/6	ND	25.0	620	0/6	0/0
2-Chloronaphthalene	mg/kg	0/6	ND	25.0	23000	0/6	0/0
2-Chlorophenol	mg/kg	0/6	ND	25.0	240	0/6	0/0
2-Methylnaphthalene	mg/kg	0/6	ND	25.0	NA	-	-
2-Methylphenol	mg/kg	0/6	ND	25.0	30800	0/6	0/0
2-Nitroaniline	mg/kg	0/6	ND	25.0	18	2/6	0/0
2-Nitrophenol	mg/kg	0/6	ND	25.0	NA	-	-
3,3-Dichlorobenzidine	mg/kg	0/6	ND	50.0	3.8	2/6	0/0
3-Nitroaniline	mg/kg	0/6	ND	50.0	NA	-	-
4,6-dinitro-2-methylphenol	mg/kg	0/6	ND	50.0	NA	-	-
4-Bromophenyl phenyl ether	mg/kg	0/6	ND	25.0	NA	-	-
4-Chloroaniline	mg/kg	0/6	ND	100.0	2500	0/6	0/0
4-Chlorophenyl phenyl ether	mg/kg	0/6	ND	25.0	NA	-	-
4-Chlorophenyl-3-methylphenol	mg/kg	0/6	ND	25.0	NA	-	-
4-Methylphenol	mg/kg	0/6	ND	25.0	3100	0/6	0/0
4-Nitroaniline	mg/kg	0/6	ND	25.0	NA	-	-
4-Nitrophenol	mg/kg	0/6	ND	50.0	NA	-	-
Acenaphthene	mg/kg	3/63	15.9	25.0	29200	0/60	0/3
Acenaphthylene	mg/kg	6/63	0.0833	25.0	29212	0/57	0/6
Anthracene	mg/kg	7/63	22.1	13.4	100000	0/56	0/7
Benzo(a)anthracene	mg/kg	20/63	16.8	13.4	2.1	3/43	1/20
Benzo(a)pyrene	mg/kg	23/63	8.74	13.4	0.21	9/40	7/23
Benzo(b)fluoranthene	mg/kg	22/63	0.448	13.4	2.1	4/41	0/22
Benzo(ghi)perylene	mg/kg	21/63	0.821	13.4	29126	0/42	0/21
Benzo(k)fluoranthene	mg/kg	19/63	0.336	13.4	21	0/44	0/19
Benzoic acid	mg/kg	0/6	ND	50.0	100000	0/6	0/0
Benzyl alcohol	mg/kg	0/6	ND	25.0	100000	0/6	0/0
Bis(2-chloroethoxy)methane	mg/kg	0/6	ND	25.0	NA	-	-
Bis(2-chloroethyl)ether	mg/kg	0/6	ND	25.0	0.55	3/6	0/0
Bis(2-chloroisopropyl)ether	mg/kg	0/6	ND	25.0	7.4	2/6	0/0
Bis(2-ethylhexyl)phthalate	mg/kg	1/6	3.85	100.0	120	0/5	0/1
Butyl benzyl phthalate	mg/kg	0/6	ND	25.0	100000	0/6	0/0

**Table A-1 - Data Quality Evaluation of Soil Chemistry Results**

Hart Crowser  
J-15302

**Willbridge Terminal - Kinder Morgan**

Date printed: 6/18/2003 Sheet 3 of 5

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Chrysene	mg/kg	26/63	25.0	13.4	210	0/37	0/26
Di-n-butyl phthalate	mg/kg	0/6	ND	50.0	62000	0/6	0/0
Di-n-octyl phthalate	mg/kg	0/6	ND	25.0	24600	0/6	0/0
Dibenzo(a,h)anthracene	mg/kg	6/63	0.0588	13.4	0.21	11/57	0/6
Dibenzofuran	mg/kg	0/6	ND	25.0	3100	0/6	0/0
Diethyl phthalate	mg/kg	0/6	ND	25.0	100000	0/6	0/0
Dimethyl phthalate	mg/kg	0/6	ND	25.0	100000	0/6	0/0
Fluoranthene	mg/kg	21/63	0.693	13.4	22000	0/42	0/21
Fluorene	mg/kg	5/63	20.3	25.0	26300	0/58	0/5
Hexachlorobenzene	mg/kg	0/6	ND	25.0	1.1	2/6	0/0
Hexachlorobutadiene	mg/kg	0/6	ND	0.2	22	0/6	0/0
Hexachlorocyclopentadiene	mg/kg	0/6	ND	50.0	3700	0/6	0/0
Hexachloroethane	mg/kg	0/6	ND	50.0	120	0/6	0/0
Indeno(1,2,3-cd)pyrene	mg/kg	20/63	0.513	13.4	2.1	4/43	0/20
Isophorone	mg/kg	0/6	ND	25.0	1800	0/6	0/0
N-nitrosodi-n-propylamine	mg/kg	0/6	ND	25.0	0.25	6/6	0/0
N-nitrosodiphenylamine	mg/kg	0/6	ND	25.0	350	0/6	0/0
Naphthalene	mg/kg	7/63	11.9	13.4	190	0/56	0/7
Nitrobenzene	mg/kg	0/6	ND	25.0	100	0/6	0/0
Pentachlorophenol	mg/kg	0/6	ND	50.0	9	2/6	0/0
Phenanthrene	mg/kg	18/63	80.8	13.4	100000	0/45	0/18
Phenol	mg/kg	0/6	ND	25.0	100000	0/6	0/0
Pyrene	mg/kg	28/63	36.1	2.68	29100	0/35	0/28
<b>Volatiles</b>							
1,1,1,2-Tetrachloroethane	mg/kg	0/6	ND	0.1	7.3	0/6	0/0
1,1,1-Trichloroethane	mg/kg	0/6	ND	0.1	1200	0/6	0/0
1,1,2,2-Tetrachloroethane	mg/kg	0/6	ND	0.1	0.93	0/6	0/0
1,1,2-Trichloroethane	mg/kg	0/6	ND	0.1	1.6	0/6	0/0
1,1-Dichloroethane	mg/kg	0/6	ND	0.1	1700	0/6	0/0
1,1-Dichloroethene	mg/kg	0/6	ND	0.1	410	0/6	0/0
1,1-Dichloropropene	mg/kg	0/6	ND	0.1	NA	-	-
1,2,3-Trichlorobenzene	mg/kg	0/6	ND	0.1	NA	-	-
1,2,3-Trichloropropane	mg/kg	0/6	ND	0.1	0.01	6/6	0/0
1,2,4-Trichlorobenzene	mg/kg	0/6	ND	0.1	3000	0/6	0/0
1,2,4-Trimethylbenzene	mg/kg	1/6	0.71	0.1	170	0/5	0/1
1,2-Dibromo-3-chloropropane	mg/kg	0/6	ND	0.2	2	0/6	0/0
1,2-Dibromoethane	mg/kg	0/6	ND	0.1	0.03	6/6	0/0

COP0020601

**Table A-1 - Data Quality Evaluation of Soil Chemistry Results**  
**Willbridge Terminal - Kinder Morgan**

Hart Crowser  
J-15302

Date printed: 6/18/2003 Sheet 4 of 5

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
1,2-Dichlorobenzene	mg/kg	0/6	ND	0.1	370	0/6	0/0
1,2-Dichloroethane	mg/kg	0/6	ND	0.1	0.6	0/6	0/0
1,2-Dichloropropane	mg/kg	0/6	ND	0.1	0.74	0/6	0/0
1,3,5-Trimethylbenzene	mg/kg	1/6	0.58	0.1	70	0/5	0/1
1,3-Dichlorobenzene	mg/kg	0/6	ND	0.1	63	0/6	0/0
1,3-Dichloropropane	mg/kg	0/6	ND	0.1	NA	-	-
1,4-Dichlorobenzene	mg/kg	0/6	ND	0.1	7.9	0/6	0/0
2,2-Dichloropropane	mg/kg	0/6	ND	0.1	NA	-	-
2-Butanone	mg/kg	0/6	ND	2.5	27100	0/6	0/0
2-Chlorotoluene	mg/kg	0/6	ND	0.1	560	0/6	0/0
2-Hexanone	mg/kg	0/6	ND	1.0	NA	-	-
4-Chlorotoluene	mg/kg	0/6	ND	0.1	NA	-	-
4-Methyl-2-pentanone	mg/kg	0/6	ND	0.5	2800	0/6	0/0
Acetone	mg/kg	0/6	ND	2.5	6000	0/6	0/0
Benzene	mg/kg	1/64	0.41	5.0	1.3	4/63	0/1
Bromobenzene	mg/kg	0/6	ND	0.1	92	0/6	0/0
Bromochloromethane	mg/kg	0/6	ND	0.1	NA	-	-
Bromodichloromethane	mg/kg	0/6	ND	0.1	1.8	0/6	0/0
Bromoform	mg/kg	0/6	ND	0.1	NA	-	-
Bromomethane	mg/kg	0/6	ND	1.0	13	0/6	0/0
Carbon tetrachloride	mg/kg	0/6	ND	0.2	0.55	0/6	0/0
Chlorobenzene	mg/kg	0/6	ND	0.1	530	0/6	0/0
Chloroethane	mg/kg	0/6	ND	0.5	6.5	0/6	0/0
Chloroform	mg/kg	0/6	ND	0.1	12	0/6	0/0
Chloromethane	mg/kg	0/6	ND	0.5	2.7	0/6	0/0
Cis-1,2-dichloroethene	mg/kg	0/6	ND	0.1	150	0/6	0/0
Cis-1,3-dichloropropene	mg/kg	0/6	ND	0.1	1.8	0/6	0/0
Dibromochloromethane	mg/kg	0/6	ND	0.1	2.6	0/6	0/0
Dibromomethane	mg/kg	0/6	ND	0.1	230	0/6	0/0
Dichlorodifluoromethane	mg/kg	0/6	ND	0.5	310	0/6	0/0
Ethylbenzene	mg/kg	7/64	7.89	5.0	20	0/57	0/7
Isopropylbenzene	mg/kg	1/6	0.187	0.1	520	0/5	0/1
Methylene chloride	mg/kg	0/6	ND	0.5	21	0/6	0/0
N-butylbenzene	mg/kg	1/6	0.848	0.1	240	0/5	0/1
N-propylbenzene	mg/kg	1/6	0.207	0.1	240	0/5	0/1
P-isopropyltoluene	mg/kg	1/6	1.28	0.1	NA	-	-
Sec-butylbenzene	mg/kg	1/6	0.632	0.1	220	0/5	0/1



**Table A-1 - Data Quality Evaluation of Soil Chemistry Results**

Hart Crowser  
J-15302

**Willbridge Terminal - Kinder Morgan**

Date printed: 6/18/2003 Sheet 5 of 5

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Styrene	mg/kg	0/6	ND	0.1	1700	0/6	0/0
Tert-butylbenzene	mg/kg	1/6	0.125	0.1	390	0/5	0/1
Tetrachloroethene	mg/kg	0/6	ND	0.1	3.4	0/6	0/0
Toluene	mg/kg	3/64	0.512	5.0	520	0/61	0/3
Trans-1,2-dichloroethene	mg/kg	0/6	ND	0.1	240	0/6	0/0
Trans-1,3-dichloropropene	mg/kg	0/6	ND	0.1	NA	-	-
Trichloroethene	mg/kg	0/6	ND	0.1	0.12	0/6	0/0
Trichlorofluoromethane	mg/kg	0/6	ND	0.5	2000	0/6	0/0
Vinyl chloride	mg/kg	0/6	ND	0.5	0.75	0/6	0/0
Xylenes	mg/kg	8/64	6.31	2.5	420	0/56	0/8
<b>TPH</b>							
Aviation gas range	mg/kg	8/8	15100.0	NA	NA	-	-

Report Name: COPC Screening of Chem Results-RA

**Footnotes:**

1 Criteria: EPA Region 9 Industrial Soil PRG (based on a carcinogenic risk of 1E-6 or an HQ of 1.0)

COP0020603

**Table A-2 - Data Quality Evaluation of Soil Chemistry Results**  
**Willbridge Terminal - Chevron**

Hart Crowser  
J-15302

Date printed: 6/18/2003 Sheet 1 of 4

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Total Metals							
Arsenic	mg/kg	4/4	5.75	NA	1.6	0/0	3/4
Barium	mg/kg	4/4	162.0	NA	67000	0/0	0/4
Cadmium	mg/kg	3/4	1.2	0.5	450	0/1	0/3
Chromium	mg/kg	4/4	24.7	NA	64	0/0	0/4
Copper	mg/kg	4/4	134.0	NA	40900	0/0	0/4
Lead	mg/kg	2/4	24.0	10.0	750	0/2	0/2
Mercury	mg/kg	1/4	0.069	0.05	310	0/3	0/1
Selenium	mg/kg	2/4	0.892	0.5	5100	0/2	0/2
Silver	mg/kg	0/4	ND	1.0	5100	0/4	0/0
Zinc	mg/kg	4/4	235.0	NA	100000	0/0	0/4
Semivolatiles							
2,4,5-Trichlorophenol	mg/kg	0/8	ND	5.0	61600	0/8	0/0
2,4,6-Trichlorophenol	mg/kg	0/8	ND	5.0	62	0/8	0/0
2,4-Dichlorophenol	mg/kg	0/8	ND	5.0	1800	0/8	0/0
2,4-Dimethylphenol	mg/kg	0/8	ND	10.0	12300	0/8	0/0
2,4-Dinitrophenol	mg/kg	0/8	ND	20.0	1200	0/8	0/0
2,4-Dinitrotoluene	mg/kg	0/8	ND	5.0	1200	0/8	0/0
2,6-Dinitrotoluene	mg/kg	0/8	ND	5.0	620	0/8	0/0
2-Chloronaphthalene	mg/kg	0/8	ND	5.0	23000	0/8	0/0
2-Chlorophenol	mg/kg	0/8	ND	5.0	240	0/8	0/0
2-Methylnaphthalene	mg/kg	0/8	ND	5.0	NA	-	-
2-Methylphenol	mg/kg	0/8	ND	5.0	30800	0/8	0/0
2-Nitroaniline	mg/kg	0/8	ND	5.0	18	0/8	0/0
2-Nitrophenol	mg/kg	0/8	ND	5.0	NA	-	-
3,3-Dichlorobenzidine	mg/kg	0/8	ND	10.0	3.8	3/8	0/0
3-Nitroaniline	mg/kg	0/8	ND	10.0	NA	-	-
4,6-dinitro-2-methylphenol	mg/kg	0/8	ND	10.0	NA	-	-
4-Bromophenyl phenyl ether	mg/kg	0/8	ND	5.0	NA	-	-
4-Chloroaniline	mg/kg	0/8	ND	20.0	2500	0/8	0/0
4-Chlorophenyl phenyl ether	mg/kg	0/8	ND	5.0	NA	-	-
4-Chlorophenyl-3-methylphenol	mg/kg	0/8	ND	5.0	NA	-	-
4-Methylphenol	mg/kg	0/8	ND	5.0	3100	0/8	0/0
4-Nitroaniline	mg/kg	0/8	ND	5.0	NA	-	-
4-Nitrophenol	mg/kg	0/8	ND	10.0	NA	-	-
Acenaphthene	mg/kg	0/27	ND	6.7	29200	0/27	0/0

**Table A-2 - Data Quality Evaluation of Soil Chemistry Results**  
**Willbridge Terminal - Chevron**

Hart Crowser  
J-15302

Date printed: 6/18/2003 Sheet 2 of 4

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Acenaphthylene	mg/kg	0/27	ND	6.7	29212	0/27	0/0
Anthracene	mg/kg	1/27	0.0343	6.7	100000	0/26	0/1
Benzo(a)anthracene	mg/kg	7/27	1.03	1.34	2.1	0/20	0/7
Benzo(a)pyrene	mg/kg	11/27	1.57	0.335	0.21	1/16	2/11
Benzo(b)fluoranthene	mg/kg	12/27	1.88	0.335	2.1	0/15	0/12
Benzo(ghi)perylene	mg/kg	12/27	1.63	0.335	29126	0/15	0/12
Benzo(k)fluoranthene	mg/kg	9/27	1.14	0.335	21	0/18	0/9
Benzoic acid	mg/kg	0/8	ND	10.0	100000	0/8	0/0
Benzyl alcohol	mg/kg	0/8	ND	5.0	100000	0/8	0/0
Bis(2-chloroethoxy)methane	mg/kg	0/8	ND	5.0	NA	-	-
Bis(2-chloroethyl)ether	mg/kg	0/8	ND	5.0	0.55	5/8	0/0
Bis(2-chloroisopropyl)ether	mg/kg	0/8	ND	5.0	7.4	0/8	0/0
Bis(2-ethylhexyl)phthalate	mg/kg	0/8	ND	20.0	120	0/8	0/0
Butyl benzyl phthalate	mg/kg	0/8	ND	5.0	100000	0/8	0/0
Chrysene	mg/kg	13/27	1.53	1.34	210	0/14	0/13
Di-n-butyl phthalate	mg/kg	0/8	ND	10.0	62000	0/8	0/0
Di-n-octyl phthalate	mg/kg	0/8	ND	5.0	24600	0/8	0/0
Dibenzo(a,h)anthracene	mg/kg	2/27	0.587	0.335	0.21	2/25	1/2
Dibenzofuran	mg/kg	1/8	0.04	5.0	3100	0/7	0/1
Diethyl phthalate	mg/kg	0/8	ND	5.0	100000	0/8	0/0
Dimethyl phthalate	mg/kg	0/8	ND	5.0	100000	0/8	0/0
Fluoranthene	mg/kg	15/27	1.93	6.7	22000	0/12	0/15
Fluorene	mg/kg	4/27	11.5	3.35	26300	0/23	0/4
Hexachlorobenzene	mg/kg	0/8	ND	5.0	1.1	2/8	0/0
Hexachlorobutadiene	mg/kg	0/8	ND	0.2	22	0/8	0/0
Hexachlorocyclopentadiene	mg/kg	0/8	ND	10.0	3700	0/8	0/0
Hexachloroethane	mg/kg	0/8	ND	10.0	120	0/8	0/0
Indeno(1,2,3-cd)pyrene	mg/kg	9/27	1.37	0.335	2.1	0/18	0/9
Isophorone	mg/kg	0/8	ND	5.0	1800	0/8	0/0
N-nitrosodi-n-propylamine	mg/kg	0/8	ND	5.0	0.25	8/8	0/0
N-nitrosodiphenylamine	mg/kg	0/8	ND	5.0	350	0/8	0/0
Naphthalene	mg/kg	2/27	0.523	6.7	190	0/25	0/2
Nitrobenzene	mg/kg	0/8	ND	5.0	100	0/8	0/0
Pentachlorophenol	mg/kg	0/8	ND	10.0	9	1/8	0/0
Phenanthrene	mg/kg	12/27	14.2	0.14	100000	0/15	0/12
Phenol	mg/kg	0/8	ND	5.0	100000	0/8	0/0
Pyrene	mg/kg	14/27	1.79	1.34	29100	0/13	0/14

COP0020605

**Table A-2 - Data Quality Evaluation of Soil Chemistry Results**  
**Willbridge Terminal - Chevron**

Hart Crowser  
J-15302

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Volatiles							
1,1,1,2-Tetrachloroethane	mg/kg	0/8	ND	0.1	7.3	0/8	0/0
1,1,1-Trichloroethane	mg/kg	0/8	ND	0.1	1200	0/8	0/0
1,1,2,2-Tetrachloroethane	mg/kg	0/8	ND	0.1	0.93	0/8	0/0
1,1,2-Trichloroethane	mg/kg	0/8	ND	0.1	1.6	0/8	0/0
1,1-Dichloroethane	mg/kg	0/8	ND	0.1	1700	0/8	0/0
1,1-Dichloroethene	mg/kg	0/8	ND	0.1	410	0/8	0/0
1,1-Dichloropropene	mg/kg	0/8	ND	0.1	NA	-	-
1,2,3-Trichlorobenzene	mg/kg	0/8	ND	0.1	NA	-	-
1,2,3-Trichloropropane	mg/kg	0/8	ND	0.1	0.01	8/8	0/0
1,2,4-Trichlorobenzene	mg/kg	0/8	ND	0.1	3000	0/8	0/0
1,2,4-Trimethylbenzene	mg/kg	1/8	5.28	0.1	170	0/7	0/1
1,2-Dibromo-3-chloropropane	mg/kg	0/8	ND	0.2	2	0/8	0/0
1,2-Dibromoethane	mg/kg	0/8	ND	0.1	0.03	8/8	0/0
1,2-Dichlorobenzene	mg/kg	0/8	ND	0.1	370	0/8	0/0
1,2-Dichloroethane	mg/kg	0/8	ND	0.1	0.6	0/8	0/0
1,2-Dichloropropane	mg/kg	0/8	ND	0.1	0.74	0/8	0/0
1,3,5-Trimethylbenzene	mg/kg	1/8	1.31	0.1	70	0/7	0/1
1,3-Dichlorobenzene	mg/kg	0/8	ND	0.1	63	0/8	0/0
1,3-Dichloropropane	mg/kg	0/8	ND	0.1	NA	-	-
1,4-Dichlorobenzene	mg/kg	0/8	ND	0.1	7.9	0/8	0/0
2,2-Dichloropropane	mg/kg	0/8	ND	0.1	NA	-	-
2-Butanone	mg/kg	0/8	ND	2.5	27100	0/8	0/0
2-Chlorotoluene	mg/kg	0/8	ND	0.1	560	0/8	0/0
2-Hexanone	mg/kg	0/8	ND	1.0	NA	-	-
4-Chlorotoluene	mg/kg	0/8	ND	0.1	NA	-	-
4-Methyl-2-pentanone	mg/kg	0/8	ND	0.5	2800	0/8	0/0
Acetone	mg/kg	0/8	ND	2.5	6000	0/8	0/0
Benzene	mg/kg	1/27	1.59	0.5	1.3	0/26	1/1
Bromobenzene	mg/kg	0/8	ND	0.1	92	0/8	0/0
Bromochloromethane	mg/kg	0/8	ND	0.1	NA	-	-
Bromodichloromethane	mg/kg	0/8	ND	0.1	1.8	0/8	0/0
Bromoform	mg/kg	0/8	ND	0.1	NA	-	-
Bromomethane	mg/kg	0/8	ND	1.0	13	0/8	0/0
Carbon tetrachloride	mg/kg	0/8	ND	0.2	0.55	0/8	0/0
Chlorobenzene	mg/kg	0/8	ND	0.1	530	0/8	0/0
Chloroethane	mg/kg	0/8	ND	0.5	6.5	0/8	0/0

**Table A-2 - Data Quality Evaluation of Soil Chemistry Results**  
**Willbridge Terminal - Chevron**

Hart Crowser  
J-15302

Date printed: 6/18/2003 Sheet 4 of 4

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Chloroform	mg/kg	0/8	ND	0.1	12	0/8	0/0
Chloromethane	mg/kg	0/8	ND	0.5	2.7	0/8	0/0
Cis-1,2-dichloroethene	mg/kg	0/8	ND	0.1	150	0/8	0/0
Cis-1,3-dichloropropene	mg/kg	0/8	ND	0.1	1.8	0/8	0/0
Dibromochloromethane	mg/kg	0/8	ND	0.1	2.6	0/8	0/0
Dibromomethane	mg/kg	0/8	ND	0.1	230	0/8	0/0
Dichlorodifluoromethane	mg/kg	0/8	ND	0.5	310	0/8	0/0
Ethylbenzene	mg/kg	2/27	1.1	0.5	20	0/25	0/2
Isopropylbenzene	mg/kg	1/8	0.31	0.1	520	0/7	0/1
Methylene chloride	mg/kg	0/8	ND	0.5	21	0/8	0/0
N-butylbenzene	mg/kg	1/8	0.323	0.1	240	0/7	0/1
N-propylbenzene	mg/kg	1/8	1.05	0.1	240	0/7	0/1
P-isopropyltoluene	mg/kg	1/8	0.163	0.1	NA	-	-
Sec-butylbenzene	mg/kg	1/8	0.152	0.1	220	0/7	0/1
Styrene	mg/kg	0/8	ND	0.1	1700	0/8	0/0
Tert-butylbenzene	mg/kg	0/8	ND	0.1	390	0/8	0/0
Tetrachloroethene	mg/kg	0/8	ND	0.1	3.4	0/8	0/0
Toluene	mg/kg	4/27	0.517	0.5	520	0/23	0/4
Trans-1,2-dichloroethene	mg/kg	0/8	ND	0.1	240	0/8	0/0
Trans-1,3-dichloropropene	mg/kg	0/8	ND	0.1	NA	-	-
Trichloroethene	mg/kg	0/8	ND	0.1	0.12	0/8	0/0
Trichlorofluoromethane	mg/kg	0/8	ND	0.5	2000	0/8	0/0
Vinyl chloride	mg/kg	0/8	ND	1.0	0.75	3/8	0/0
Xylenes	mg/kg	4/27	2.47	0.5	420	0/23	0/4

Report Name: COPC Screening of Chem Results-RA

**Footnotes:**

1 Criteria: EPA Region 9 Industrial Soil PRG (based on a carcinogenic risk of 1E-6 or an HQ of 1.0).

COP0020607

**Table A-3 - Data Quality Evaluation of Soil Chemistry Results**  
**Willbridge Terminal - Conoco Phillips**

Hart Crowser  
J-15302

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Total Metals							
Arsenic	mg/kg	6/6	288.0	NA	1.6	0/0	6/6
Barium	mg/kg	6/6	187.0	NA	67000	0/0	0/6
Cadmium	mg/kg	4/6	2.17	0.5	450	0/2	0/4
Chromium	mg/kg	6/6	29.8	NA	64	0/0	0/6
Copper	mg/kg	6/6	80.8	NA	40900	0/0	0/6
Lead	mg/kg	3/6	29.1	10.0	750	0/3	0/3
Mercury	mg/kg	2/6	0.253	0.05	310	0/4	0/2
Selenium	mg/kg	3/6	0.663	0.5	5100	0/3	0/3
Silver	mg/kg	0/6	ND	1.0	5100	0/6	0/0
Zinc	mg/kg	6/6	212.0	NA	100000	0/0	0/6
Semivolatiles							
2,4,5-Trichlorophenol	mg/kg	0/9	ND	5.0	61600	0/9	0/0
2,4,6-Trichlorophenol	mg/kg	0/9	ND	5.0	62	0/9	0/0
2,4-Dichlorophenol	mg/kg	0/9	ND	5.0	1800	0/9	0/0
2,4-Dimethylphenol	mg/kg	0/9	ND	10.0	12300	0/9	0/0
2,4-Dinitrophenol	mg/kg	0/9	ND	20.0	1200	0/9	0/0
2,4-Dinitrotoluene	mg/kg	0/9	ND	5.0	1200	0/9	0/0
2,6-Dinitrotoluene	mg/kg	0/9	ND	5.0	620	0/9	0/0
2-Chloronaphthalene	mg/kg	0/9	ND	5.0	23000	0/9	0/0
2-Chlorophenol	mg/kg	0/9	ND	5.0	240	0/9	0/0
2-Methylnaphthalene	mg/kg	0/9	ND	5.0	NA	-	-
2-Methylphenol	mg/kg	0/9	ND	5.0	30800	0/9	0/0
2-Nitroaniline	mg/kg	0/9	ND	5.0	18	0/9	0/0
2-Nitrophenol	mg/kg	0/9	ND	5.0	NA	-	-
3,3-Dichlorobenzidine	mg/kg	0/9	ND	10.0	3.8	4/9	0/0
3-Nitroaniline	mg/kg	0/9	ND	10.0	NA	-	-
4,6-dinitro-2-methylphenol	mg/kg	0/9	ND	10.0	NA	-	-
4-Bromophenyl phenyl ether	mg/kg	0/9	ND	5.0	NA	-	-
4-Chloroaniline	mg/kg	0/9	ND	20.0	2500	0/9	0/0
4-Chlorophenyl phenyl ether	mg/kg	0/9	ND	5.0	NA	-	-
4-Chlorophenyl-3-methylphenol	mg/kg	0/9	ND	5.0	NA	-	-
4-Methylphenol	mg/kg	0/9	ND	5.0	3100	0/9	0/0
4-Nitroaniline	mg/kg	0/9	ND	5.0	NA	-	-
4-Nitrophenol	mg/kg	0/9	ND	10.0	NA	-	-
Acenaphthene	mg/kg	0/37	ND	3.35	29200	0/37	0/0

**Table A-3 - Data Quality Evaluation of Soil Chemistry Results**

Hart Crowser  
J-15302

**Willbridge Terminal - Conoco Phillips**

Date printed: 6/18/2003 Sheet 2 of 4

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Acenaphthylene	mg/kg	0/37	ND	3.35	29212	0/37	0/0
Anthracene	mg/kg	1/37	0.0396	1.68	100000	0/36	0/1
Benzo(a)anthracene	mg/kg	8/37	0.408	0.67	2.1	0/29	0/8
Benzo(a)pyrene	mg/kg	9/37	0.338	0.67	0.21	4/28	2/9
Benzo(b)fluoranthene	mg/kg	8/37	0.594	0.67	2.1	0/29	0/8
Benzo(ghi)perylene	mg/kg	8/37	0.245	0.67	29126	0/29	0/8
Benzo(k)fluoranthene	mg/kg	6/37	0.16	0.67	21	0/31	0/6
Benzoic acid	mg/kg	0/9	ND	10.0	100000	0/9	0/0
Benzyl alcohol	mg/kg	0/9	ND	5.0	100000	0/9	0/0
Bis(2-chloroethoxy)methane	mg/kg	0/9	ND	5.0	NA	-	-
Bis(2-chloroethyl)ether	mg/kg	0/9	ND	5.0	0.55	6/9	0/0
Bis(2-chloroisopropyl)ether	mg/kg	0/9	ND	5.0	7.4	0/9	0/0
Bis(2-ethylhexyl)phthalate	mg/kg	0/9	ND	20.0	120	0/9	0/0
Butyl benzyl phthalate	mg/kg	0/9	ND	5.0	100000	0/9	0/0
Chrysene	mg/kg	8/37	0.322	0.67	210	0/29	0/8
Di-n-butyl phthalate	mg/kg	0/9	ND	10.0	62000	0/9	0/0
Di-n-octyl phthalate	mg/kg	0/9	ND	5.0	24600	0/9	0/0
Dibenzo(a,h)anthracene	mg/kg	4/37	0.0829	0.67	0.21	4/33	0/4
Dibenzofuran	mg/kg	0/9	ND	5.0	3100	0/9	0/0
Diethyl phthalate	mg/kg	0/9	ND	5.0	100000	0/9	0/0
Dimethyl phthalate	mg/kg	0/9	ND	5.0	100000	0/9	0/0
Fluoranthene	mg/kg	10/37	0.467	1.68	22000	0/27	0/10
Fluorene	mg/kg	0/37	ND	3.35	26300	0/37	0/0
Hexachlorobenzene	mg/kg	0/9	ND	5.0	1.1	4/9	0/0
Hexachlorobutadiene	mg/kg	0/9	ND	0.2	22	0/9	0/0
Hexachlorocyclopentadiene	mg/kg	0/9	ND	10.0	3700	0/9	0/0
Hexachloroethane	mg/kg	0/9	ND	10.0	120	0/9	0/0
Indeno(1,2,3-cd)pyrene	mg/kg	8/37	0.173	0.67	2.1	0/29	0/8
Isophorone	mg/kg	0/9	ND	5.0	1800	0/9	0/0
N-nitrosodi-n-propylamine	mg/kg	0/9	ND	5.0	0.25	9/9	0/0
N-nitrosodiphenylamine	mg/kg	0/9	ND	5.0	350	0/9	0/0
Naphthalene	mg/kg	0/37	ND	16.8	190	0/37	0/0
Nitrobenzene	mg/kg	0/9	ND	5.0	100	0/9	0/0
Pentachlorophenol	mg/kg	0/9	ND	10.0	9	2/9	0/0
Phenanthrene	mg/kg	7/37	5.01	1.68	100000	0/30	0/7
Phenol	mg/kg	0/9	ND	5.0	100000	0/9	0/0
Pyrene	mg/kg	13/37	0.854	0.5	29100	0/24	0/13

**Table A-3 - Data Quality Evaluation of Soil Chemistry Results**  
**Willbridge Terminal - Conoco Phillips**

Hart Crowser  
J-15302

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Volatiles							
1,1,1,2-Tetrachloroethane	mg/kg	0/9	ND	0.1	7.3	0/9	0/0
1,1,1-Trichloroethane	mg/kg	0/9	ND	0.1	1200	0/9	0/0
1,1,2,2-Tetrachloroethane	mg/kg	0/9	ND	0.1	0.93	0/9	0/0
1,1,2-Trichloroethane	mg/kg	0/9	ND	0.1	1.6	0/9	0/0
1,1-Dichloroethane	mg/kg	0/9	ND	0.1	1700	0/9	0/0
1,1-Dichloroethene	mg/kg	0/9	ND	0.1	410	0/9	0/0
1,1-Dichloropropene	mg/kg	0/9	ND	0.1	NA	-	-
1,2,3-Trichlorobenzene	mg/kg	0/9	ND	0.1	NA	-	-
1,2,3-Trichloropropane	mg/kg	0/9	ND	0.1	0.01	9/9	0/0
1,2,4-Trichlorobenzene	mg/kg	0/9	ND	0.1	3000	0/9	0/0
1,2,4-Trimethylbenzene	mg/kg	0/9	ND	0.1	170	0/9	0/0
1,2-Dibromo-3-chloropropane	mg/kg	0/9	ND	0.2	2	0/9	0/0
1,2-Dibromoethane	mg/kg	0/9	ND	0.1	0.03	9/9	0/0
1,2-Dichlorobenzene	mg/kg	0/9	ND	0.1	370	0/9	0/0
1,2-Dichloroethane	mg/kg	0/9	ND	0.1	0.6	0/9	0/0
1,2-Dichloropropane	mg/kg	0/9	ND	0.1	0.74	0/9	0/0
1,3,5-Trimethylbenzene	mg/kg	0/9	ND	0.1	70	0/9	0/0
1,3-Dichlorobenzene	mg/kg	0/9	ND	0.1	63	0/9	0/0
1,3-Dichloropropane	mg/kg	0/9	ND	0.1	NA	-	-
1,4-Dichlorobenzene	mg/kg	0/9	ND	0.1	7.9	0/9	0/0
2,2-Dichloropropane	mg/kg	0/9	ND	0.1	NA	-	-
2-Butanone	mg/kg	0/9	ND	2.5	27100	0/9	0/0
2-Chlorotoluene	mg/kg	0/9	ND	0.1	560	0/9	0/0
2-Hexanone	mg/kg	0/9	ND	1.0	NA	-	-
4-Chlorotoluene	mg/kg	0/9	ND	0.1	NA	-	-
4-Methyl-2-pentanone	mg/kg	0/9	ND	0.5	2800	0/9	0/0
Acetone	mg/kg	0/9	ND	2.5	6000	0/9	0/0
Benzene	mg/kg	5/41	1.16	0.2	1.3	0/36	0/5
Bromobenzene	mg/kg	0/9	ND	0.1	92	0/9	0/0
Bromochloromethane	mg/kg	0/9	ND	0.1	NA	-	-
Bromodichloromethane	mg/kg	0/9	ND	0.1	1.8	0/9	0/0
Bromoform	mg/kg	0/9	ND	0.1	NA	-	-
Bromomethane	mg/kg	0/9	ND	1.0	13	0/9	0/0
Carbon tetrachloride	mg/kg	0/9	ND	0.2	0.55	0/9	0/0
Chlorobenzene	mg/kg	0/9	ND	0.1	530	0/9	0/0
Chloroethane	mg/kg	0/9	ND	0.5	6.5	0/9	0/0

COP0020610



**Table A-3 - Data Quality Evaluation of Soil Chemistry Results**  
**Willbridge Terminal - Conoco Phillips**

Hart Crowser  
J-15302

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Chloroform	mg/kg	0/9	ND	0.1	12	0/9	0/0
Chloromethane	mg/kg	0/9	ND	0.5	2.7	0/9	0/0
Cis-1,2-dichloroethene	mg/kg	0/9	ND	0.1	150	0/9	0/0
Cis-1,3-dichloropropene	mg/kg	0/9	ND	0.1	1.8	0/9	0/0
Dibromochloromethane	mg/kg	0/9	ND	0.1	2.6	0/9	0/0
Dibromomethane	mg/kg	0/9	ND	0.1	230	0/9	0/0
Dichlorodifluoromethane	mg/kg	0/9	ND	0.5	310	0/9	0/0
Ethylbenzene	mg/kg	5/41	6.62	0.1	20	0/36	0/5
Isopropylbenzene	mg/kg	0/9	ND	0.1	520	0/9	0/0
Methylene chloride	mg/kg	0/9	ND	0.5	21	0/9	0/0
N-butylbenzene	mg/kg	0/9	ND	0.1	240	0/9	0/0
N-propylbenzene	mg/kg	0/9	ND	0.1	240	0/9	0/0
P-isopropyltoluene	mg/kg	0/9	ND	0.1	NA	-	-
Sec-butylbenzene	mg/kg	0/9	ND	0.1	220	0/9	0/0
Styrene	mg/kg	0/9	ND	0.1	1700	0/9	0/0
Tert-butylbenzene	mg/kg	0/9	ND	0.1	390	0/9	0/0
Tetrachloroethene	mg/kg	0/9	ND	0.1	3.4	0/9	0/0
Toluene	mg/kg	4/41	1.32	1.0	520	0/37	0/4
Trans-1,2-dichloroethene	mg/kg	0/9	ND	0.1	240	0/9	0/0
Trans-1,3-dichloropropene	mg/kg	0/9	ND	0.1	NA	-	-
Trichloroethene	mg/kg	0/9	ND	0.1	0.12	0/9	0/0
Trichlorofluoromethane	mg/kg	0/9	ND	0.5	2000	0/9	0/0
Vinyl chloride	mg/kg	0/9	ND	1.0	0.75	2/9	0/0
Xylenes	mg/kg	8/41	13.9	0.1	420	0/33	0/8
<b>TPH</b>							
Gasoline range	mg/kg	2/4	5.56	4.0	NA	-	-
Phthalene	mg/kg	0/3	ND	0.05	NA	-	-

Report Name: COPC Screening of Chem Results-RA

**Footnotes:**

1 Criteria: EPA Region 9 Industrial Soil PRG (based on a carcinogenic risk of 1E-6 or an HQ of 1.0).

COP0020611

**Table A-4 - Data Quality Evaluation of Soil Chemistry Results**  
**Willbridge Terminal - Utility Corridor**

Hart Crowser  
J-15302

Date printed: 6/18/2003 Sheet 1 of 5

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Total Metals							
Arsenic	mg/kg	7/7	7.89	NA	1.6	0/0	6/7
Barium	mg/kg	7/7	114.0	NA	67000	0/0	0/7
Cadmium	mg/kg	0/7	ND	0.5	450	0/7	0/0
Chromium	mg/kg	7/7	20.9	NA	64	0/0	0/7
Copper	mg/kg	7/7	28.6	NA	40900	0/0	0/7
Lead	mg/kg	1/7	34.9	10.0	750	0/6	0/1
Mercury	mg/kg	1/7	0.0612	0.05	310	0/6	0/1
Selenium	mg/kg	0/7	ND	0.5	5100	0/7	0/0
Silver	mg/kg	0/7	ND	2.5	5100	0/7	0/0
Zinc	mg/kg	7/7	74.3	NA	100000	0/0	0/7
Pesticides/PCBs							
4,4'-DDD	µg/kg	1/7	57.7	13.4	10000	0/6	0/1
4,4'-DDE	µg/kg	0/7	ND	33.5	7000	0/7	0/0
4,4'-DDT	µg/kg	0/7	ND	33.5	7000	0/7	0/0
Aldrin	µg/kg	0/7	ND	33.5	100	0/7	0/0
Alpha-BHC	µg/kg	0/7	ND	33.5	360	0/7	0/0
Alpha-chlordane	µg/kg	0/7	ND	33.5	6470	0/7	0/0
Beta-BHC	µg/kg	0/7	ND	33.5	1300	0/7	0/0
Chlordane (tech)	µg/kg	0/7	ND	750.0	6500	0/7	0/0
Delta-BHC	µg/kg	0/7	ND	33.5	NA	-	-
Dieldrin	µg/kg	0/7	ND	33.5	110	0/7	0/0
Endosulfan I	µg/kg	0/7	ND	33.5	3694000	0/7	0/0
Endosulfan II	µg/kg	0/7	ND	33.5	3694000	0/7	0/0
Endosulfan sulfate	µg/kg	0/7	ND	33.5	3694000	0/7	0/0
Endrin	µg/kg	0/7	ND	33.5	185000	0/7	0/0
Endrin aldehyde	µg/kg	0/7	ND	33.5	185000	0/7	0/0
Endrin ketone	µg/kg	0/7	ND	33.5	185000	0/7	0/0
Gamma-BHC (lindane)	µg/kg	0/7	ND	33.5	1700	0/7	0/0
Gamma-chlordane	µg/kg	0/7	ND	33.5	6470	0/7	0/0
Heptachlor	µg/kg	0/7	ND	33.5	380	0/7	0/0
Heptachlor epoxide	µg/kg	0/7	ND	33.5	190	0/7	0/0
Methoxychlor	µg/kg	0/7	ND	33.5	3078000	0/7	0/0
Toxaphene	µg/kg	0/7	ND	1000.0	1600	0/7	0/0
Semivolatiles							
2,4,5-Trichlorophenol	mg/kg	0/7	ND	50.0	61600	0/7	0/0

**Table A-4 - Data Quality Evaluation of Soil Chemistry Results**  
**Willbridge Terminal - Utility Corridor**

Hart Crowser  
J-15302

Date printed: 6/18/2003 Sheet 2 of 5

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
2,4,6-Trichlorophenol	mg/kg	0/7	ND	50.0	62	0/7	0/0
2,4-Dichlorophenol	mg/kg	0/7	ND	50.0	1800	0/7	0/0
2,4-Dimethylphenol	mg/kg	0/7	ND	100.0	12300	0/7	0/0
2,4-Dinitrophenol	mg/kg	0/7	ND	200.0	1200	0/7	0/0
2,4-Dinitrotoluene	mg/kg	0/7	ND	50.0	1200	0/7	0/0
2,6-Dinitrotoluene	mg/kg	0/7	ND	50.0	620	0/7	0/0
2-Chloronaphthalene	mg/kg	0/7	ND	50.0	23000	0/7	0/0
2-Chlorophenol	mg/kg	0/7	ND	50.0	240	0/7	0/0
2-Methylnaphthalene	mg/kg	0/7	ND	50.0	NA	-	-
2-Methylphenol	mg/kg	0/7	ND	50.0	30800	0/7	0/0
2-Nitroaniline	mg/kg	0/7	ND	50.0	18	1/7	0/0
2-Nitrophenol	mg/kg	0/7	ND	50.0	NA	-	-
3,3-Dichlorobenzidine	mg/kg	0/7	ND	100.0	3.8	3/7	0/0
3-Nitroaniline	mg/kg	0/7	ND	100.0	NA	-	-
4,6-dinitro-2-methylphenol	mg/kg	0/7	ND	100.0	NA	-	-
4-Bromophenyl phenyl ether	mg/kg	0/7	ND	50.0	NA	-	-
4-Chloroaniline	mg/kg	0/7	ND	200.0	2500	0/7	0/0
4-Chlorophenyl phenyl ether	mg/kg	0/7	ND	50.0	NA	-	-
4-Chlorophenyl-3-methylphen	mg/kg	0/7	ND	50.0	NA	-	-
4-Methylphenol	mg/kg	0/7	ND	50.0	3100	0/7	0/0
4-Nitroaniline	mg/kg	0/7	ND	50.0	NA	-	-
4-Nitrophenol	mg/kg	0/7	ND	100.0	NA	-	-
Acenaphthene	mg/kg	2/36	2.65	0.67	29200	0/34	0/2
Acenaphthylene	mg/kg	5/36	0.0477	1.68	29212	0/31	0/5
Anthracene	mg/kg	8/36	1.35	0.67	100000	0/28	0/8
Benzo(a)anthracene	mg/kg	18/36	0.352	0.67	2.1	0/18	0/18
Benzo(a)pyrene	mg/kg	17/36	0.28	0.67	0.21	1/19	2/17
Benzo(b)fluoranthene	mg/kg	17/36	0.169	0.67	2.1	0/19	0/17
Benzo(ghi)perylene	mg/kg	16/36	0.15	0.67	29126	0/20	0/16
Benzo(k)fluoranthene	mg/kg	13/36	0.199	0.67	21	0/23	0/13
Benzoic acid	mg/kg	0/7	ND	100.0	100000	0/7	0/0
Benzyl alcohol	mg/kg	0/7	ND	50.0	100000	0/7	0/0
Bis(2-chloroethoxy)methane	mg/kg	0/7	ND	50.0	NA	-	-
Bis(2-chloroethyl)ether	mg/kg	0/7	ND	50.0	0.55	3/7	0/0
Bis(2-chloroisopropyl)ether	mg/kg	0/7	ND	50.0	7.4	1/7	0/0
Bis(2-ethylhexyl)phthalate	mg/kg	4/7	5.97	200.0	120	1/3	0/4
Butyl benzyl phthalate	mg/kg	0/7	ND	50.0	100000	0/7	0/0

**Table A-4 - Data Quality Evaluation of Soil Chemistry Results**  
**Willbridge Terminal - Utility Corridor**

Hart Crowser  
J-15302

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Chrysene	mg/kg	18/36	0.834	0.0335	210	0/18	0/18
Di-n-butyl phthalate	mg/kg	0/7	ND	100.0	62000	0/7	0/0
Di-n-octyl phthalate	mg/kg	0/7	ND	50.0	24600	0/7	0/0
Dibenzo(a,h)anthracene	mg/kg	7/36	0.0446	50.0	0.21	7/29	0/7
Dibenzofuran	mg/kg	0/7	ND	50.0	3100	0/7	0/0
Diethyl phthalate	mg/kg	0/7	ND	50.0	100000	0/7	0/0
Dimethyl phthalate	mg/kg	0/7	ND	50.0	100000	0/7	0/0
Fluoranthene	mg/kg	22/36	1.89	0.67	22000	0/14	0/22
Fluorene	mg/kg	5/36	4.3	0.67	26300	0/31	0/5
Hexachlorobenzene	mg/kg	0/7	ND	50.0	1.1	3/7	0/0
Hexachlorobutadiene	mg/kg	0/7	ND	0.2	22	0/7	0/0
Hexachlorocyclopentadiene	mg/kg	0/7	ND	100.0	3700	0/7	0/0
Hexachloroethane	mg/kg	0/7	ND	100.0	120	0/7	0/0
Indeno(1,2,3-cd)pyrene	mg/kg	14/36	0.103	0.67	2.1	0/22	0/14
Isophorone	mg/kg	0/7	ND	50.0	1800	0/7	0/0
N-nitrosodi-n-propylamine	mg/kg	0/7	ND	50.0	0.25	7/7	0/0
N-nitrosodiphenylamine	mg/kg	0/7	ND	50.0	350	0/7	0/0
Naphthalene	mg/kg	5/36	0.102	0.168	190	0/31	0/5
Nitrobenzene	mg/kg	0/7	ND	50.0	100	0/7	0/0
Pentachlorophenol	mg/kg	0/7	ND	100.0	9	3/7	0/0
Phenanthrene	mg/kg	18/36	7.84	0.0335	100000	0/18	0/18
Phenol	mg/kg	0/7	ND	50.0	100000	0/7	0/0
Pyrene	mg/kg	23/36	2.17	0.0134	29100	0/13	0/23
<b>Volatiles</b>							
1,1,1,2-Tetrachloroethane	mg/kg	0/7	ND	0.1	7.3	0/7	0/0
1,1,1-Trichloroethane	mg/kg	0/7	ND	0.1	1200	0/7	0/0
1,1,2,2-Tetrachloroethane	mg/kg	0/7	ND	0.1	0.93	0/7	0/0
1,1,2-Trichloroethane	mg/kg	0/7	ND	0.1	1.6	0/7	0/0
1,1-Dichloroethane	mg/kg	0/7	ND	0.1	1700	0/7	0/0
1,1-Dichloroethene	mg/kg	0/7	ND	0.1	410	0/7	0/0
1,1-Dichloropropene	mg/kg	0/7	ND	0.1	NA	-	-
1,2,3-Trichlorobenzene	mg/kg	0/7	ND	0.1	NA	-	-
1,2,3-Trichloropropane	mg/kg	0/7	ND	0.1	0.01	7/7	0/0
1,2,4-Trichlorobenzene	mg/kg	0/7	ND	0.1	3000	0/7	0/0
1,2,4-Trimethylbenzene	mg/kg	0/7	ND	0.1	170	0/7	0/0
1,2-Dibromo-3-chloropropane	mg/kg	0/7	ND	0.1	2	0/7	0/0
1,2-Dibromoethane	mg/kg	0/7	ND	0.1	0.03	7/7	0/0

**Table A-4 - Data Quality Evaluation of Soil Chemistry Results**  
**Willbridge Terminal - Utility Corridor**

Hart Crowser  
J-15302

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (I)	SQLs > Criteria	Detects > Criteria
1,2-Dichlorobenzene	mg/kg	0/7	ND	0.1	370	0/7	0/0
1,2-Dichloroethane	mg/kg	0/7	ND	0.1	0.6	0/7	0/0
1,2-Dichloropropane	mg/kg	0/7	ND	0.1	0.74	0/7	0/0
1,3,5-Trimethylbenzene	mg/kg	0/7	ND	0.1	70	0/7	0/0
1,3-Dichlorobenzene	mg/kg	0/7	ND	0.1	63	0/7	0/0
1,3-Dichloropropane	mg/kg	0/7	ND	0.1	NA	-	-
1,4-Dichlorobenzene	mg/kg	0/7	ND	0.1	7.9	0/7	0/0
2,2-Dichloropropane	mg/kg	0/7	ND	0.1	NA	-	-
2-Butanone	mg/kg	0/7	ND	2.5	27100	0/7	0/0
2-Chlorotoluene	mg/kg	0/7	ND	0.1	560	0/7	0/0
2-Hexanone	mg/kg	0/7	ND	1.0	NA	-	-
4-Chlorotoluene	mg/kg	0/7	ND	0.1	NA	-	-
4-Methyl-2-pentanone	mg/kg	0/7	ND	0.5	2800	0/7	0/0
Acetone	mg/kg	0/7	ND	2.5	6000	0/7	0/0
Benzene	mg/kg	0/36	ND	0.1	1.3	0/36	0/0
Bromobenzene	mg/kg	0/7	ND	0.1	92	0/7	0/0
Bromochloromethane	mg/kg	0/7	ND	0.1	NA	-	-
Bromodichloromethane	mg/kg	0/7	ND	0.1	1.8	0/7	0/0
Bromoform	mg/kg	0/7	ND	0.1	NA	-	-
Bromomethane	mg/kg	0/7	ND	1.0	13	0/7	0/0
Carbon tetrachloride	mg/kg	0/7	ND	0.1	0.55	0/7	0/0
Chlorobenzene	mg/kg	0/7	ND	0.1	530	0/7	0/0
Chloroethane	mg/kg	0/7	ND	0.5	6.5	0/7	0/0
Chloroform	mg/kg	0/7	ND	0.1	12	0/7	0/0
Chloromethane	mg/kg	0/7	ND	0.5	2.7	0/7	0/0
Cis-1,2-dichloroethene	mg/kg	0/7	ND	0.1	150	0/7	0/0
Cis-1,3-dichloropropene	mg/kg	0/7	ND	0.1	1.8	0/7	0/0
Dibromochloromethane	mg/kg	0/7	ND	0.1	2.6	0/7	0/0
Dibromomethane	mg/kg	0/7	ND	0.1	230	0/7	0/0
Dichlorodifluoromethane	mg/kg	0/7	ND	0.5	310	0/7	0/0
Ethylbenzene	mg/kg	3/36	1.34	0.05	20	0/33	0/3
Isopropylbenzene	mg/kg	1/7	0.497	0.1	520	0/6	0/1
Methylene chloride	mg/kg	0/7	ND	0.5	21	0/7	0/0
N-butylbenzene	mg/kg	1/7	1.86	0.1	240	0/6	0/1
N-propylbenzene	mg/kg	1/7	2.43	0.1	240	0/6	0/1
P-isopropyltoluene	mg/kg	0/7	ND	0.1	NA	-	-
Sec-butylbenzene	mg/kg	1/7	0.531	0.1	220	0/6	0/1

**Table A-4 - Data Quality Evaluation of Soil Chemistry Results**  
**Willbridge Terminal - Utility Corridor**

Hart Crowser  
J-15302

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Styrene	mg/kg	0/7	ND	0.1	1700	0/7	0/0
Tert-butylbenzene	mg/kg	0/7	ND	0.1	390	0/7	0/0
Tetrachloroethene	mg/kg	0/7	ND	0.1	3.4	0/7	0/0
Toluene	mg/kg	3/36	1.27	0.05	520	0/33	0/3
Trans-1,2-dichloroethene	mg/kg	0/7	ND	0.1	240	0/7	0/0
Trans-1,3-dichloropropene	mg/kg	0/7	ND	0.1	NA	-	-
Trichloroethene	mg/kg	0/7	ND	0.1	0.12	0/7	0/0
Trichlorofluoromethane	mg/kg	0/7	ND	0.1	2000	0/7	0/0
Vinyl chloride	mg/kg	0/7	ND	0.5	0.75	0/7	0/0
Xylenes	mg/kg	3/36	3.79	0.05	420	0/33	0/3

Report Name: COPC Screening of Chem Results-RA

**Footnotes:**

1 Criteria: EPA Region 9 Industrial Soil PRG (based on a carcinogenic risk of 1E-6 or an HQ of 1.0).

**Table A-5 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Kinder Morgan**

Hart Crowser  
J-15302

Date printed: 6/18/2003 Sheet 1 of 5

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Dissolved Metals							
Arsenic	mg/L	13/14	0.0234	0.001	4.5E-05	1/1	13/13
Barium	mg/L	14/14	0.191	NA	2.6	0/0	0/14
Cadmium	mg/L	2/14	0.0018	0.001	0.018	0/12	0/2
Chromium	mg/L	2/14	0.0015	0.001	0.11	0/12	0/2
Copper	mg/L	0/6	ND	0.002	1.5	0/6	0/0
Lead	mg/L	2/14	0.161	0.001	0.015	0/12	1/2
Mercury	mg/L	5/14	0.0006	0.0005	0.011	0/9	0/5
Selenium	mg/L	1/14	0.0013	0.001	0.18	0/13	0/1
Silver	mg/L	2/14	0.0016	0.001	0.18	0/12	0/2
Zinc	mg/L	5/6	0.0413	0.005	11	0/1	0/5
Total Metals							
Arsenic	mg/L	143/153	0.162	0.002	4.5E-05	10/10	143/143
Barium	mg/L	152/153	0.67	0.01	2.6	0/1	0/152
Cadmium	mg/L	21/153	0.007	0.001	0.018	0/132	0/21
Chromium	mg/L	100/153	0.0344	0.001	0.11	0/53	0/100
Copper	mg/L	88/129	0.144	0.002	1.5	0/41	0/88
Lead	mg/L	99/153	0.0786	0.001	0.015	0/54	18/99
Mercury	mg/L	12/153	0.0008	0.002	0.011	0/141	0/12
Selenium	mg/L	38/153	0.0048	0.005	0.18	0/115	0/38
Silver	mg/L	9/153	0.0071	0.001	0.18	0/144	0/9
Zinc	mg/L	99/129	0.208	0.01	11	0/30	0/99
Pesticides/PCBs							
4,4'-DDD	µg/L	1/24	0.415	2.0	0.28	2/23	1/1
4,4'-DDE	µg/L	0/24	ND	2.0	0.2	2/24	0/0
4,4'-DDT	µg/L	0/24	ND	2.0	0.2	2/24	0/0
Aldrin	µg/L	0/24	ND	2.0	0.004	24/24	0/0
Alpha-BHC	µg/L	1/24	0.131	2.0	0.011	23/23	1/1
Alpha-chlordane	µg/L	0/24	ND	2.0	0.19	2/24	0/0
Beta-BHC	µg/L	0/24	ND	2.0	0.037	24/24	0/0
Chlordane (tech)	µg/L	0/24	ND	20.0	0.19	24/24	0/0
Delta-BHC	µg/L	0/24	ND	2.0	NA	-	-
Dieldrin	µg/L	0/24	ND	2.0	0.0042	24/24	0/0
Endosulfan I	µg/L	0/24	ND	2.0	220	0/24	0/0
Endosulfan II	µg/L	0/24	ND	2.0	220	0/24	0/0
Endosulfan sulfate	µg/L	0/24	ND	2.0	220	0/24	0/0

**Table A-5 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Kinder Morgan**

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Endrin	µg/L	0/24	ND	2.0	11	0/24	0/0
Endrin aldehyde	µg/L	0/24	ND	2.0	11	0/24	0/0
Endrin ketone	µg/L	0/24	ND	2.0	11	0/24	0/0
Gamma-BHC (lindane)	µg/L	1/24	9.43	2.0	0.052	23/23	1/1
Gamma-chlordane	µg/L	0/24	ND	2.0	0.19	2/24	0/0
Heptachlor	µg/L	0/24	ND	2.0	0.015	24/24	0/0
Heptachlor epoxide	µg/L	0/24	ND	2.0	0.0074	24/24	0/0
Methoxychlor	µg/L	0/24	ND	2.0	180	0/24	0/0
Toxaphene	µg/L	0/24	ND	20.0	0.061	24/24	0/0
<b>Semivolatiles</b>							
2,4,5-Trichlorophenol	µg/L	0/10	ND	5.0	3600	0/10	0/0
2,4,6-Trichlorophenol	µg/L	0/10	ND	5.0	3.6	10/10	0/0
2,4-Dichlorophenol	µg/L	0/10	ND	5.0	110	0/10	0/0
2,4-Dimethylphenol	µg/L	1/10	40.6	10.0	730	0/9	0/1
2,4-Dinitrophenol	µg/L	0/10	ND	25.0	73	0/10	0/0
2,4-Dinitrotoluene	µg/L	0/10	ND	5.0	73	0/10	0/0
2,6-Dinitrotoluene	µg/L	0/10	ND	5.0	36	0/10	0/0
2-Chloronaphthalene	µg/L	0/10	ND	5.0	490	0/10	0/0
2-Chlorophenol	µg/L	0/10	ND	5.0	30	0/10	0/0
2-Methylnaphthalene	µg/L	1/10	108.0	5.0	NA	-	-
2-Methylphenol	µg/L	0/10	ND	10.0	1800	0/10	0/0
2-Nitroaniline	µg/L	0/10	ND	5.0	1	10/10	0/0
2-Nitrophenol	µg/L	0/10	ND	5.0	NA	-	-
3,3-Dichlorobenzidine	µg/L	0/10	ND	5.0	0.15	10/10	0/0
3-Nitroaniline	µg/L	0/10	ND	10.0	NA	-	-
4,6-dinitro-2-methylphenol	µg/L	0/10	ND	10.0	NA	-	-
4-Bromophenyl phenyl ether	µg/L	0/10	ND	5.0	NA	-	-
4-Chloroaniline	µg/L	0/10	ND	20.0	150	0/10	0/0
4-Chlorophenyl phenyl ether	µg/L	0/10	ND	5.0	NA	-	-
4-Chlorophenyl-3-methylphenol	µg/L	0/10	ND	5.0	NA	-	-
4-Methylphenol	µg/L	1/10	16.5	5.0	180	0/9	0/1
4-Nitroaniline	µg/L	0/10	ND	10.0	NA	-	-
4-Nitrophenol	µg/L	0/10	ND	25.0	NA	-	-
Acenaphthene	µg/L	69/129	5.6	5.0	370	0/60	0/69
Acenaphthylene	µg/L	4/117	53.3	5.0	370	0/113	0/4
Anthracene	µg/L	7/117	0.561	5.0	1800	0/110	0/7
Benzo(a)anthracene	µg/L	5/116	0.13	5.0	0.092	94/111	2/5



**Table A-5 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Kinder Morgan**

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Benzo(a)pyrene	µg/L	3/116	0.128	5.0	0.0092	113/113	3/3
Benzo(b)fluoranthene	µg/L	4/116	0.22	5.0	0.092	94/112	2/4
Benzo(ghi)perylene	µg/L	5/115	0.14	5.0	180	0/110	0/5
Benzo(k)fluoranthene	µg/L	3/115	0.135	5.0	0.92	10/112	0/3
Benzoic acid	µg/L	0/10	ND	50.0	150000	0/10	0/0
Benzyl alcohol	µg/L	0/10	ND	10.0	11000	0/10	0/0
Bis(2-chloroethoxy)methane	µg/L	0/10	ND	10.0	NA	-	-
Bis(2-chloroethyl)ether	µg/L	0/10	ND	5.0	0.0098	10/10	0/0
Bis(2-chloroisopropyl)ether	µg/L	0/10	ND	10.0	0.27	10/10	0/0
Bis(2-ethylhexyl)phthalate	µg/L	1/10	15.9	10.0	4.8	9/9	1/1
Butyl benzyl phthalate	µg/L	0/10	ND	5.0	7300	0/10	0/0
Chrysene	µg/L	7/117	583.0	5.0	9.2	0/110	1/7
Di-n-butyl phthalate	µg/L	0/10	ND	5.0	3600	0/10	0/0
Di-n-octyl phthalate	µg/L	0/10	ND	5.0	1500	0/10	0/0
Dibenzo(a,h)anthracene	µg/L	1/115	0.1	5.0	0.0092	114/114	1/1
Dibenzofuran	µg/L	0/10	ND	5.0	24	0/10	0/0
Diethyl phthalate	µg/L	0/10	ND	5.0	29000	0/10	0/0
Dimethyl phthalate	µg/L	0/10	ND	5.0	360000	0/10	0/0
Fluoranthene	µg/L	22/120	1.23	5.0	1500	0/98	0/22
Fluorene	µg/L	42/127	8.02	5.0	240	0/85	0/42
Hexachlorobenzene	µg/L	0/10	ND	5.0	0.042	10/10	0/0
Hexachlorobutadiene	µg/L	0/10	ND	10.0	0.86	10/10	0/0
Hexachlorocyclopentadiene	µg/L	0/10	ND	10.0	220	0/10	0/0
Hexachloroethane	µg/L	0/10	ND	10.0	4.8	10/10	0/0
Indeno(1,2,3-cd)pyrene	µg/L	5/115	0.14	5.0	0.092	92/110	4/5
Isophorone	µg/L	0/10	ND	5.0	71	0/10	0/0
N-nitrosodi-n-propylamine	µg/L	0/10	ND	10.0	0.0096	10/10	0/0
N-nitrosodiphenylamine	µg/L	0/10	ND	5.0	14	0/10	0/0
Naphthalene	µg/L	34/125	572.0	10.0	6.2	1/91	16/34
Nitrobenzene	µg/L	0/10	ND	5.0	3.4	10/10	0/0
Pentachlorophenol	µg/L	0/10	ND	10.0	0.56	10/10	0/0
Phenanthrene	µg/L	49/127	8.69	5.0	1800	0/78	0/49
Phenol	µg/L	0/10	ND	5.0	22000	0/10	0/0
Pyrene	µg/L	30/123	2.71	5.0	180	0/93	0/30
<b>Volatiles</b>							
1,1,1,2-Tetrachloroethane	µg/L	0/10	ND	100.0	0.43	10/10	0/0
1,1,1-Trichloroethane	µg/L	0/10	ND	100.0	3200	0/10	0/0

**Table A-5 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Kinder Morgan**

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
1,1,2,2-Tetrachloroethane	µg/L	0/10	ND	100.0	0.055	10/10	0/0
1,1,2-Trichloroethane	µg/L	0/10	ND	100.0	0.2	10/10	0/0
1,1-Dichloroethane	µg/L	0/10	ND	100.0	810	0/10	0/0
1,1-Dichloroethene	µg/L	0/10	ND	100.0	340	0/10	0/0
1,1-Dichloropropene	µg/L	0/10	ND	100.0	NA	-	-
1,2,3-Trichlorobenzene	µg/L	0/10	ND	100.0	NA	-	-
1,2,3-Trichloropropane	µg/L	0/10	ND	100.0	0.0056	10/10	0/0
1,2,4-Trichlorobenzene	µg/L	0/10	ND	5.0	190	0/10	0/0
1,2,4-Trimethylbenzene	µg/L	1/10	1360.0	5.0	12	0/9	1/1
1,2-Dibromo-3-chloropropane	µg/L	0/10	ND	100.0	0.048	10/10	0/0
1,2-Dibromoethane	µg/L	0/10	ND	100.0	0.00076	10/10	0/0
1,2-Dichlorobenzene	µg/L	0/10	ND	5.0	370	0/10	0/0
1,2-Dichloroethane	µg/L	0/10	ND	100.0	0.12	10/10	0/0
1,2-Dichloropropane	µg/L	0/10	ND	100.0	0.16	10/10	0/0
1,3,5-Trimethylbenzene	µg/L	2/10	327.0	2.0	12	0/8	1/2
1,3-Dichlorobenzene	µg/L	0/10	ND	5.0	5.5	0/10	0/0
1,3-Dichloropropane	µg/L	0/10	ND	100.0	NA	-	-
1,4-Dichlorobenzene	µg/L	0/10	ND	5.0	0.5	10/10	0/0
2,2-Dichloropropane	µg/L	0/10	ND	100.0	NA	-	-
2-Butanone	µg/L	0/10	ND	2500.0	1900	1/10	0/0
2-Chlorotoluene	µg/L	0/10	ND	100.0	120	0/10	0/0
2-Hexanone	µg/L	0/10	ND	1000.0	NA	-	-
4-Chlorotoluene	µg/L	0/10	ND	100.0	NA	-	-
4-Methyl-2-pentanone	µg/L	0/10	ND	500.0	160	1/10	0/0
Acetone	µg/L	0/10	ND	2500.0	610	1/10	0/0
Benzene	µg/L	55/139	6200.0	2.0	0.34	84/84	54/55
Bromobenzene	µg/L	0/10	ND	100.0	20	1/10	0/0
Bromochloromethane	µg/L	0/10	ND	100.0	NA	-	-
Bromodichloromethane	µg/L	0/10	ND	100.0	0.18	10/10	0/0
Bromoform	µg/L	0/10	ND	100.0	8.5	1/10	0/0
Bromomethane	µg/L	0/10	ND	1000.0	8.7	10/10	0/0
Carbon tetrachloride	µg/L	0/10	ND	100.0	0.17	10/10	0/0
Chlorobenzene	µg/L	0/10	ND	100.0	110	0/10	0/0
Chloroethane	µg/L	0/10	ND	100.0	4.6	2/10	0/0
Chloroform	µg/L	1/10	6.79	100.0	6.2	1/9	1/1
Chloromethane	µg/L	0/10	ND	500.0	1.5	10/10	0/0
Cis-1,2-dichloroethene	µg/L	0/10	ND	100.0	61	1/10	0/0

**Table A-5 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Kinder Morgan**

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Cis-1,3-dichloropropene	µg/L	0/10	ND	100.0	0.4	10/10	0/0
Dibromochloromethane	µg/L	0/10	ND	100.0	0.13	10/10	0/0
Dibromomethane	µg/L	0/10	ND	100.0	61	1/10	0/0
Dichlorodifluoromethane	µg/L	0/10	ND	500.0	390	1/10	0/0
Ethylbenzene	µg/L	48/142	4880.0	2.0	1300	0/94	13/48
Isopropylbenzene	µg/L	3/10	13.8	100.0	660	0/7	0/3
Methylene chloride	µg/L	0/10	ND	500.0	4.3	10/10	0/0
N-butylbenzene	µg/L	1/10	4.44	100.0	240	0/9	0/1
N-propylbenzene	µg/L	4/10	163.0	1.0	240	0/6	0/4
P-isopropyltoluene	µg/L	2/10	2.02	100.0	NA	-	-
Sec-butylbenzene	µg/L	2/10	4.96	100.0	240	0/8	0/2
Styrene	µg/L	0/10	ND	100.0	1600	0/10	0/0
Tert-butylbenzene	µg/L	0/10	ND	100.0	240	0/10	0/0
Tetrachloroethene	µg/L	0/10	ND	100.0	0.66	10/10	0/0
Toluene	µg/L	55/145	2820.0	5.0	720	0/90	13/55
Trans-1,2-dichloroethene	µg/L	0/10	ND	100.0	120	0/10	0/0
Trans-1,3-dichloropropene	µg/L	0/10	ND	100.0	0.4	10/10	0/0
Trichloroethene	µg/L	0/10	ND	100.0	0.028	10/10	0/0
Trichlorofluoromethane	µg/L	0/10	ND	100.0	1300	0/10	0/0
Vinyl chloride	µg/L	0/10	ND	100.0	0.02	10/10	0/0
Xylenes	µg/L	62/145	14900.0	4.0	210	0/83	14/62

Report Name: COPC Screening of Chem Results-RA

**Footnotes:**

1 Criteria: EPA Region 9 Tap Water PRG (based on a carcinogenic risk of 1E-6 or an HQ of 1.0).

COP0020621

**Table A-6 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Chevron**

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Dissolved Metals							
Arsenic	mg/L	8/9	0.0375	0.001	4.5E-05	1/1	8/8
Barium	mg/L	9/9	0.0723	NA	2.6	0/0	0/9
Cadmium	mg/L	0/9	ND	0.001	0.018	0/9	0/0
Chromium	mg/L	1/9	0.001	0.001	0.11	0/8	0/1
Copper	mg/L	0/5	ND	0.002	1.5	0/5	0/0
Lead	mg/L	1/9	0.0011	0.001	0.015	0/8	0/1
Mercury	mg/L	3/9	0.0004	0.0005	0.011	0/6	0/3
Selenium	mg/L	0/9	ND	0.001	0.18	0/9	0/0
Silver	mg/L	0/9	ND	0.001	0.18	0/9	0/0
Zinc	mg/L	5/5	0.019	NA	11	0/0	0/5
Total Metals							
Arsenic	mg/L	111/115	0.0827	0.001	4.5E-05	4/4	111/111
Barium	mg/L	116/116	1.33	NA	2.6	0/0	0/116
Cadmium	mg/L	27/115	0.0355	0.005	0.018	0/88	2/27
Chromium	mg/L	79/116	0.217	0.001	0.11	0/37	4/79
Copper	mg/L	73/100	0.242	0.002	1.5	0/27	0/73
Lead	mg/L	78/116	0.132	0.001	0.015	0/38	28/78
Mercury	mg/L	14/115	0.0018	0.001	0.011	0/101	0/14
Selenium	mg/L	58/116	0.0045	0.005	0.18	0/58	0/58
Silver	mg/L	11/115	0.005	0.005	0.18	0/104	0/11
Zinc	mg/L	74/100	0.428	0.01	11	0/26	0/74
Semivolatiles							
2,4,5-Trichlorophenol	µg/L	0/7	ND	50.0	3600	0/7	0/0
2,4,6-Trichlorophenol	µg/L	0/7	ND	50.0	3.6	7/7	0/0
2,4-Dichlorophenol	µg/L	0/7	ND	50.0	110	0/7	0/0
2,4-Dimethylphenol	µg/L	0/7	ND	100.0	730	0/7	0/0
2,4-Dinitrophenol	µg/L	0/7	ND	250.0	73	1/7	0/0
2,4-Dinitrotoluene	µg/L	0/7	ND	50.0	73	0/7	0/0
2,6-Dinitrotoluene	µg/L	0/7	ND	50.0	36	1/7	0/0
2-Chloronaphthalene	µg/L	0/7	ND	50.0	490	0/7	0/0
2-Chlorophenol	µg/L	0/7	ND	50.0	30	1/7	0/0
2-Methylnaphthalene	µg/L	3/7	41.4	50.0	NA	-	-
2-Methylphenol	µg/L	0/7	ND	100.0	1800	0/7	0/0
2-Nitroaniline	µg/L	0/7	ND	50.0	1	7/7	0/0
2-Nitrophenol	µg/L	0/7	ND	50.0	NA	-	-

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**Table A-6 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Chevron**

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (I)	SQLs > Criteria	Detects > Criteria
3,3-Dichlorobenzidine	µg/L	0/7	ND	50.0	0.15	7/7	0/0
3-Nitroaniline	µg/L	0/7	ND	100.0	NA	-	-
4,6-dinitro-2-methylphenol	µg/L	0/7	ND	100.0	NA	-	-
4-Bromophenyl phenyl ether	µg/L	0/7	ND	50.0	NA	-	-
4-Chloroaniline	µg/L	0/7	ND	200.0	150	1/7	0/0
4-Chlorophenyl phenyl ether	µg/L	0/7	ND	50.0	NA	-	-
4-Chlorophenyl-3-methylphen	µg/L	0/7	ND	50.0	NA	-	-
4-Methylphenol	µg/L	0/7	ND	50.0	180	0/7	0/0
4-Nitroaniline	µg/L	0/7	ND	100.0	NA	-	-
4-Nitrophenol	µg/L	0/7	ND	250.0	NA	-	-
Acenaphthene	µg/L	58/105	27.6	50.0	370	0/47	0/58
Acenaphthylene	µg/L	6/98	0.4	50.0	370	0/92	0/6
Anthracene	µg/L	19/103	1.85	50.0	1800	0/84	0/19
Benzo(a)anthracene	µg/L	13/102	1.36	50.0	0.092	86/89	10/13
Benzo(a)pyrene	µg/L	14/100	2.47	50.0	0.0092	86/86	14/14
Benzo(b)fluoranthene	µg/L	16/101	2.98	50.0	0.092	82/85	15/16
Benzo(ghi)perylene	µg/L	17/100	2.92	50.0	180	0/83	0/17
Benzo(k)fluoranthene	µg/L	8/100	1.3	50.0	0.92	15/92	1/8
Benzoic acid	µg/L	0/7	ND	500.0	150000	0/7	0/0
Benzyl alcohol	µg/L	0/7	ND	100.0	11000	0/7	0/0
Bis(2-chloroethoxy)methane	µg/L	0/7	ND	100.0	NA	-	-
Bis(2-chloroethyl)ether	µg/L	0/7	ND	50.0	0.0098	7/7	0/0
Bis(2-chloroisopropyl)ether	µg/L	0/7	ND	100.0	0.27	7/7	0/0
Bis(2-ethylhexyl)phthalate	µg/L	0/7	ND	100.0	4.8	7/7	0/0
Butyl benzyl phthalate	µg/L	0/7	ND	50.0	7300	0/7	0/0
Chrysene	µg/L	16/104	2.29	50.0	9.2	6/88	0/16
Di-n-butyl phthalate	µg/L	0/7	ND	50.0	3600	0/7	0/0
Di-n-octyl phthalate	µg/L	0/7	ND	50.0	1500	0/7	0/0
Dibenzo(a,h)anthracene	µg/L	4/99	3.42	50.0	0.0092	95/95	4/4
Dibenzofuran	µg/L	0/7	ND	50.0	24	1/7	0/0
Diethyl phthalate	µg/L	0/7	ND	50.0	29000	0/7	0/0
Dimethyl phthalate	µg/L	0/7	ND	50.0	360000	0/7	0/0
Fluoranthene	µg/L	25/105	7.26	50.0	1500	0/80	0/25
Fluorene	µg/L	76/107	172.0	50.0	240	0/31	0/76
Hexachlorobenzene	µg/L	0/7	ND	50.0	0.042	7/7	0/0
Hexachlorobutadiene	µg/L	0/7	ND	10.0	0.86	7/7	0/0
Hexachlorocyclopentadiene	µg/L	0/7	ND	100.0	220	0/7	0/0

COP0020623

**Table A-6 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Chevron**

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Hexachloroethane	µg/L	0/7	ND	100.0	4.8	7/7	0/0
Indeno(1,2,3-cd)pyrene	µg/L	15/100	1.96	50.0	0.092	82/85	13/15
Isophorone	µg/L	0/7	ND	50.0	71	0/7	0/0
N-nitrosodi-n-propylamine	µg/L	0/7	ND	100.0	0.0096	7/7	0/0
N-nitrosodiphenylamine	µg/L	0/7	ND	50.0	14	1/7	0/0
Naphthalene	µg/L	22/100	242.0	25.0	6.2	5/78	7/22
Nitrobenzene	µg/L	0/7	ND	50.0	3.4	7/7	0/0
Pentachlorophenol	µg/L	0/7	ND	100.0	0.56	7/7	0/0
Phenanthrene	µg/L	70/111	264.0	50.0	1800	0/41	0/70
Phenol	µg/L	0/7	ND	50.0	22000	0/7	0/0
Pyrene	µg/L	42/108	14.6	50.0	180	0/66	0/42
<b>Volatiles</b>							
1,1,1,2-Tetrachloroethane	µg/L	0/7	ND	5.0	0.43	7/7	0/0
1,1,1-Trichloroethane	µg/L	0/7	ND	5.0	3200	0/7	0/0
1,1,2,2-Tetrachloroethane	µg/L	0/7	ND	5.0	0.055	7/7	0/0
1,1,2-Trichloroethane	µg/L	0/7	ND	5.0	0.2	7/7	0/0
1,1-Dichloroethane	µg/L	0/7	ND	5.0	810	0/7	0/0
1,1-Dichloroethene	µg/L	0/7	ND	5.0	340	0/7	0/0
1,1-Dichloropropene	µg/L	0/7	ND	5.0	NA	-	-
1,2,3-Trichlorobenzene	µg/L	0/7	ND	5.0	NA	-	-
1,2,3-Trichloropropane	µg/L	0/7	ND	5.0	0.0056	7/7	0/0
1,2,4-Trichlorobenzene	µg/L	0/7	ND	5.0	190	0/7	0/0
1,2,4-Trimethylbenzene	µg/L	1/7	47.9	5.0	12	0/6	1/1
1,2-Dibromo-3-chloropropane	µg/L	0/7	ND	10.0	0.048	7/7	0/0
1,2-Dibromoethane	µg/L	0/7	ND	5.0	0.00076	7/7	0/0
1,2-Dichlorobenzene	µg/L	0/7	ND	5.0	370	0/7	0/0
1,2-Dichloroethane	µg/L	0/7	ND	5.0	0.12	7/7	0/0
1,2-Dichloropropane	µg/L	0/7	ND	5.0	0.16	7/7	0/0
1,3,5-Trimethylbenzene	µg/L	2/7	9.77	5.0	12	0/5	0/2
1,3-Dichlorobenzene	µg/L	0/7	ND	5.0	5.5	0/7	0/0
1,3-Dichloropropane	µg/L	0/7	ND	5.0	NA	-	-
1,4-Dichlorobenzene	µg/L	0/7	ND	5.0	0.5	7/7	0/0
2,2-Dichloropropane	µg/L	0/7	ND	5.0	NA	-	-
2-Butanone	µg/L	0/7	ND	125.0	1900	0/7	0/0
2-Chlorotoluene	µg/L	0/7	ND	5.0	120	0/7	0/0
2-Hexanone	µg/L	0/7	ND	50.0	NA	-	-
4-Chlorotoluene	µg/L	0/7	ND	5.0	NA	-	-

**Table A-6 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Chevron**

Hart Crowser  
J-15302

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
4-Methyl-2-pentanone	µg/L	0/7	ND	25.0	160	0/7	0/0
Acetone	µg/L	0/7	ND	125.0	610	0/7	0/0
Benzene	µg/L	62/110	1650.0	0.5	0.34	48/48	61/62
Bromobenzene	µg/L	0/7	ND	5.0	20	0/7	0/0
Bromochloromethane	µg/L	0/7	ND	5.0	NA	-	-
Bromodichloromethane	µg/L	0/7	ND	5.0	0.18	7/7	0/0
Bromoform	µg/L	0/7	ND	5.0	8.5	0/7	0/0
Bromomethane	µg/L	0/7	ND	50.0	8.7	7/7	0/0
Carbon tetrachloride	µg/L	0/7	ND	10.0	0.17	7/7	0/0
Chlorobenzene	µg/L	0/7	ND	5.0	110	0/7	0/0
Chloroethane	µg/L	0/7	ND	25.0	4.6	6/7	0/0
Chloroform	µg/L	0/7	ND	5.0	6.2	0/7	0/0
Chloromethane	µg/L	0/7	ND	25.0	1.5	7/7	0/0
Cis-1,2-dichloroethene	µg/L	0/7	ND	5.0	61	0/7	0/0
Cis-1,3-dichloropropene	µg/L	0/7	ND	5.0	0.4	7/7	0/0
Dibromochloromethane	µg/L	0/7	ND	5.0	0.13	7/7	0/0
Dibromomethane	µg/L	0/7	ND	5.0	61	0/7	0/0
Dichlorodifluoromethane	µg/L	0/7	ND	25.0	390	0/7	0/0
Ethylbenzene	µg/L	53/112	619.0	5.0	1300	0/59	0/53
Isopropylbenzene	µg/L	7/7	65.9	NA	660	0/0	0/7
Methylene chloride	µg/L	0/7	ND	25.0	4.3	7/7	0/0
N-butylbenzene	µg/L	5/7	18.2	1.0	240	0/2	0/5
N-propylbenzene	µg/L	7/7	112.0	NA	240	0/0	0/7
P-isopropyltoluene	µg/L	0/7	ND	5.0	NA	-	-
Sec-butylbenzene	µg/L	4/7	8.75	5.0	240	0/3	0/4
Styrene	µg/L	0/7	ND	5.0	1600	0/7	0/0
Tert-butylbenzene	µg/L	0/7	ND	5.0	240	0/7	0/0
Tetrachloroethene	µg/L	0/7	ND	5.0	0.66	7/7	0/0
Toluene	µg/L	66/113	91.4	5.0	720	0/47	0/66
Trans-1,2-dichloroethene	µg/L	0/7	ND	5.0	120	0/7	0/0
Trans-1,3-dichloropropene	µg/L	0/7	ND	5.0	0.4	7/7	0/0
Trichloroethene	µg/L	0/7	ND	5.0	0.028	7/7	0/0
Trichlorofluoromethane	µg/L	0/7	ND	25.0	1300	0/7	0/0
Vinyl chloride	µg/L	0/7	ND	5.0	0.02	7/7	0/0
Xylenes	µg/L	55/111	109.0	10.0	210	0/56	0/55
<b>Conventionals</b>							
Methane	mg/L	1/1	27700.0	NA	NA	-	-

**Table A-6 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Chevron**

Hart Crowser  
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Date printed: 6/18/2003 Sheet 5 of 5

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria

Report Name: COPC Screening of Chem Results-RA

**Footnotes:**

1 Criteria: EPA Region 9 Tap Water PRG (based on a carcinogenic risk of 1E-6 or an HQ of 1.0).



**Table A-7 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Conoco Phillips**

Hart Crowser  
J-15302

Date printed: 6/18/2003 Sheet 1 of 5

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Dissolved Metals							
Arsenic	mg/L	10/10	0.228	NA	4.5E-05	0/0	10/10
Barium	mg/L	10/10	0.414	NA	2.6	0/0	0/10
Cadmium	mg/L	0/10	ND	0.001	0.018	0/10	0/0
Chromium	mg/L	5/10	0.0713	0.001	0.11	0/5	0/5
Copper	mg/L	5/6	0.0953	0.002	1.5	0/1	0/5
Lead	mg/L	7/10	0.0492	0.001	0.015	0/3	3/7
Mercury	mg/L	6/10	0.0011	0.0004	0.011	0/4	0/6
Selenium	mg/L	3/10	0.0016	0.001	0.18	0/7	0/3
Silver	mg/L	0/10	ND	0.001	0.18	0/10	0/0
Zinc	mg/L	5/6	1.95	0.005	11	0/1	0/5
Total Metals							
Arsenic	mg/L	101/102	0.897	0.01	4.5E-05	1/1	101/101
Barium	mg/L	102/102	3.39	NA	2.6	0/0	1/102
Cadmium	mg/L	12/102	0.0115	0.05	0.018	1/90	0/12
Chromium	mg/L	92/102	0.317	0.01	0.11	0/10	4/92
Copper	mg/L	87/89	0.403	0.002	1.5	0/2	0/87
Lead	mg/L	91/101	0.176	0.0102	0.015	0/10	27/91
Mercury	mg/L	19/102	0.0009	0.002	0.011	0/83	0/19
Selenium	mg/L	43/102	0.0034	0.05	0.18	0/59	0/43
Silver	mg/L	11/102	0.0056	0.05	0.18	0/91	0/11
Zinc	mg/L	87/89	2.59	0.05	11	0/2	0/87
Semivolatiles							
2,4,5-Trichlorophenol	µg/L	0/6	ND	50.0	3600	0/6	0/0
2,4,6-Trichlorophenol	µg/L	0/6	ND	50.0	3.6	6/6	0/0
2,4-Dichlorophenol	µg/L	0/6	ND	50.0	110	0/6	0/0
2,4-Dimethylphenol	µg/L	0/6	ND	100.0	730	0/6	0/0
2,4-Dinitrophenol	µg/L	0/6	ND	250.0	73	1/6	0/0
2,4-Dinitrotoluene	µg/L	0/6	ND	50.0	73	0/6	0/0
2,6-Dinitrotoluene	µg/L	0/6	ND	50.0	36	1/6	0/0
2-Chloronaphthalene	µg/L	0/6	ND	50.0	490	0/6	0/0
2-Chlorophenol	µg/L	0/6	ND	50.0	30	1/6	0/0
2-Methylnaphthalene	µg/L	0/6	ND	50.0	NA	-	-
2-Methylphenol	µg/L	0/6	ND	100.0	1800	0/6	0/0
2-Nitroaniline	µg/L	0/6	ND	50.0	1	6/6	0/0
2-Nitrophenol	µg/L	0/6	ND	50.0	NA	-	-

**Table A-7 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Conoco Phillips**

Hart Crowser  
J-15302

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
3,3-Dichlorobenzidine	µg/L	0/6	ND	50.0	0.15	6/6	0/0
3-Nitroaniline	µg/L	0/6	ND	100.0	NA	-	-
4,6-dinitro-2-methylphenol	µg/L	0/6	ND	100.0	NA	-	-
4-Bromophenyl phenyl ether	µg/L	0/6	ND	50.0	NA	-	-
4-Chloroaniline	µg/L	0/6	ND	200.0	150	1/6	0/0
4-Chlorophenyl phenyl ether	µg/L	0/6	ND	50.0	NA	-	-
4-Chlorophenyl-3-methylphen	µg/L	0/6	ND	50.0	NA	-	-
4-Methylphenol	µg/L	0/6	ND	50.0	180	0/6	0/0
4-Nitroaniline	µg/L	0/6	ND	100.0	NA	-	-
4-Nitrophenol	µg/L	0/6	ND	250.0	NA	-	-
Acenaphthene	µg/L	51/92	91.4	50.0	370	0/41	0/51
Acenaphthylene	µg/L	4/82	0.36	50.0	370	0/78	0/4
Anthracene	µg/L	24/84	71.2	50.0	1800	0/60	0/24
Benzo(a)anthracene	µg/L	15/83	29.6	5.0	0.092	65/68	13/15
Benzo(a)pyrene	µg/L	3/82	2.6	25.0	0.0092	79/79	3/3
Benzo(b)fluoranthene	µg/L	5/82	3.69	25.0	0.092	72/77	5/5
Benzo(ghi)perylene	µg/L	3/82	2.54	25.0	180	0/79	0/3
Benzo(k)fluoranthene	µg/L	0/82	ND	25.0	0.92	10/82	0/0
Benzoic acid	µg/L	0/6	ND	500.0	150000	0/6	0/0
Benzyl alcohol	µg/L	0/6	ND	100.0	11000	0/6	0/0
Bis(2-chloroethoxy)methane	µg/L	0/6	ND	100.0	NA	-	-
Bis(2-chloroethyl)ether	µg/L	0/6	ND	50.0	0.0098	6/6	0/0
Bis(2-chloroisopropyl)ether	µg/L	0/6	ND	100.0	0.27	6/6	0/0
Bis(2-ethylhexyl)phthalate	µg/L	0/6	ND	100.0	4.8	6/6	0/0
Butyl benzyl phthalate	µg/L	0/6	ND	50.0	7300	0/6	0/0
Chrysene	µg/L	14/83	13.5	25.0	9.2	1/69	1/14
Di-n-butyl phthalate	µg/L	0/6	ND	50.0	3600	0/6	0/0
Di-n-octyl phthalate	µg/L	0/6	ND	50.0	1500	0/6	0/0
Dibenzo(a,h)anthracene	µg/L	0/82	ND	50.0	0.0092	82/82	0/0
Dibenzofuran	µg/L	0/6	ND	50.0	24	1/6	0/0
Diethyl phthalate	µg/L	0/6	ND	50.0	29000	0/6	0/0
Dimethyl phthalate	µg/L	0/6	ND	50.0	360000	0/6	0/0
Fluoranthene	µg/L	22/86	178.0	20.0	1500	0/64	0/22
Fluorene	µg/L	68/97	238.0	50.0	240	0/29	0/68
Hexachlorobenzene	µg/L	0/6	ND	50.0	0.042	6/6	0/0
Hexachlorobutadiene	µg/L	0/7	ND	10.0	0.86	7/7	0/0
Hexachlorocyclopentadiene	µg/L	0/6	ND	100.0	220	0/6	0/0

COP0020628

**Table A-7 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Conoco Phillips**

Hart Crowser  
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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Hexachloroethane	µg/L	0/6	ND	100.0	4.8	6/6	0/0
Indeno(1,2,3-cd)pyrene	µg/L	2/82	0.664	25.0	0.092	75/80	1/2
Isophorone	µg/L	0/6	ND	50.0	71	0/6	0/0
N-nitrosodi-n-propylamine	µg/L	0/6	ND	100.0	0.0096	6/6	0/0
N-nitrosodiphenylamine	µg/L	0/6	ND	50.0	14	1/6	0/0
Naphthalene	µg/L	12/83	90.0	50.0	6.2	7/71	3/12
Nitrobenzene	µg/L	0/6	ND	50.0	3.4	6/6	0/0
Pentachlorophenol	µg/L	0/6	ND	100.0	0.56	6/6	0/0
Phenanthrene	µg/L	59/96	479.0	5.0	1800	0/37	0/59
Phenol	µg/L	0/6	ND	50.0	22000	0/6	0/0
Pyrene	µg/L	37/88	123.0	5.0	180	0/51	0/37
<b>Volatiles</b>							
1,1,1,2-Tetrachloroethane	µg/L	0/8	ND	2.0	0.43	8/8	0/0
1,1,1-Trichloroethane	µg/L	0/8	ND	2.0	3200	0/8	0/0
1,1,2,2-Tetrachloroethane	µg/L	0/8	ND	2.0	0.055	8/8	0/0
1,1,2-Trichloroethane	µg/L	0/8	ND	2.0	0.2	8/8	0/0
1,1-Dichloroethane	µg/L	0/8	ND	2.0	810	0/8	0/0
1,1-Dichloroethene	µg/L	0/8	ND	2.0	340	0/8	0/0
1,1-Dichloropropene	µg/L	0/8	ND	2.0	NA	-	-
1,2,3-Trichlorobenzene	µg/L	0/8	ND	2.0	NA	-	-
1,2,3-Trichloropropane	µg/L	0/8	ND	2.0	0.0056	8/8	0/0
1,2,4-Trichlorobenzene	µg/L	0/8	ND	2.0	190	0/8	0/0
1,2,4-Trimethylbenzene	µg/L	3/8	64.5	2.0	12	0/5	1/3
1,2-Dibromo-3-chloropropane	µg/L	0/8	ND	10.0	0.048	8/8	0/0
1,2-Dibromoethane	µg/L	0/8	ND	5.0	0.00076	8/8	0/0
1,2-Dichlorobenzene	µg/L	0/8	ND	5.0	370	0/8	0/0
1,2-Dichloroethane	µg/L	0/8	ND	5.0	0.12	8/8	0/0
1,2-Dichloropropane	µg/L	0/8	ND	5.0	0.16	8/8	0/0
1,3,5-Trimethylbenzene	µg/L	3/8	36.2	2.0	12	0/5	2/3
1,3-Dichlorobenzene	µg/L	0/8	ND	5.0	5.5	0/8	0/0
1,3-Dichloropropane	µg/L	0/8	ND	5.0	NA	-	-
1,4-Dichlorobenzene	µg/L	0/8	ND	5.0	0.5	8/8	0/0
2,2-Dichloropropane	µg/L	0/8	ND	5.0	NA	-	-
2-Butanone	µg/L	0/8	ND	125.0	1900	0/8	0/0
2-Chlorotoluene	µg/L	0/8	ND	5.0	120	0/8	0/0
2-Hexanone	µg/L	0/8	ND	50.0	NA	-	-
4-Chlorotoluene	µg/L	0/8	ND	5.0	NA	-	-

**Table A-7 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Conoco Phillips**

Hart Crowser  
J-15302

Date printed: 6/18/2003 Sheet 4 of 5

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
4-Methyl-2-pentanone	µg/L	0/8	ND	25.0	160	0/8	0/0
Acetone	µg/L	0/8	ND	200.0	610	0/8	0/0
Benzene	µg/L	52/99	712.0	2.5	0.34	47/47	52/52
Bromobenzene	µg/L	0/8	ND	5.0	20	0/8	0/0
Bromochloromethane	µg/L	0/8	ND	5.0	NA	-	-
Bromodichloromethane	µg/L	0/8	ND	5.0	0.18	8/8	0/0
Bromoform	µg/L	0/8	ND	5.0	8.5	0/8	0/0
Bromomethane	µg/L	0/8	ND	50.0	8.7	8/8	0/0
Carbon tetrachloride	µg/L	0/8	ND	10.0	0.17	8/8	0/0
Chlorobenzene	µg/L	0/8	ND	5.0	110	0/8	0/0
Chloroethane	µg/L	0/8	ND	25.0	4.6	8/8	0/0
Chloroform	µg/L	0/8	ND	5.0	6.2	0/8	0/0
Chloromethane	µg/L	0/8	ND	25.0	1.5	8/8	0/0
Cis-1,2-dichloroethene	µg/L	0/8	ND	5.0	61	0/8	0/0
Cis-1,3-dichloropropene	µg/L	0/8	ND	5.0	0.4	8/8	0/0
Dibromochloromethane	µg/L	0/8	ND	5.0	0.13	8/8	0/0
Dibromomethane	µg/L	0/8	ND	5.0	61	0/8	0/0
Dichlorodifluoromethane	µg/L	0/8	ND	25.0	390	0/8	0/0
Ethylbenzene	µg/L	55/99	990.0	2.5	1300	0/44	0/55
Isopropylbenzene	µg/L	5/8	201.0	1.0	660	0/3	0/5
Methylene chloride	µg/L	0/8	ND	25.0	4.3	8/8	0/0
N-butylbenzene	µg/L	3/8	40.5	2.0	240	0/5	0/3
N-propylbenzene	µg/L	5/8	250.0	1.0	240	0/3	1/5
P-isopropyltoluene	µg/L	1/8	4.24	5.0	NA	-	-
Sec-butylbenzene	µg/L	5/8	16.6	1.0	240	0/3	0/5
Styrene	µg/L	0/8	ND	5.0	1600	0/8	0/0
Tert-butylbenzene	µg/L	1/8	6.18	5.0	240	0/7	0/1
Tetrachloroethene	µg/L	0/8	ND	5.0	0.66	8/8	0/0
Toluene	µg/L	53/100	44.4	12.5	720	0/47	0/53
Trans-1,2-dichloroethene	µg/L	0/8	ND	5.0	120	0/8	0/0
Trans-1,3-dichloropropene	µg/L	0/8	ND	5.0	0.4	8/8	0/0
Trichloroethene	µg/L	0/8	ND	5.0	0.028	8/8	0/0
Trichlorofluoromethane	µg/L	0/8	ND	25.0	1300	0/8	0/0
Vinyl chloride	µg/L	0/8	ND	5.0	0.02	8/8	0/0
Xylenes	µg/L	47/98	237.0	5.0	210	0/51	1/47

**Table A-7 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Conoco Phillips**

Hart Crowser  
J-15302

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria

Report Name: COPC Screening of Chem Results-RA

**Footnotes:**

1 Criteria: EPA Region 9 Tap Water PRG (based on a carcinogenic risk of 1E-6 or an HQ of 1.0)

**Table A-8 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Utility Corridor**

Hart Crowser  
J-15302

Date printed: 6/18/2003 Sheet 1 of 5

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Dissolved Metals							
Arsenic	mg/L	6/6	0.0375	NA	4.5E-05	0/0	6/6
Barium	mg/L	6/6	0.191	NA	2.6	0/0	0/6
Cadmium	mg/L	0/6	ND	0.001	0.018	0/6	0/0
Chromium	mg/L	0/6	ND	0.001	0.11	0/6	0/0
Copper	mg/L	0/2	ND	0.002	1.5	0/2	0/0
Lead	mg/L	1/6	0.0057	0.001	0.015	0/5	0/1
Mercury	mg/L	2/6	0.0004	0.0004	0.011	0/4	0/2
Selenium	mg/L	0/6	ND	0.001	0.18	0/6	0/0
Silver	mg/L	0/6	ND	0.001	0.18	0/6	0/0
Zinc	mg/L	2/2	0.0175	NA	11	0/0	0/2
Total Metals							
Arsenic	mg/L	69/72	0.116	0.001	4.5E-05	3/3	69/69
Barium	mg/L	72/72	0.985	NA	2.6	0/0	0/72
Cadmium	mg/L	17/72	0.0355	0.005	0.018	0/55	1/17
Chromium	mg/L	50/72	0.145	0.001	0.11	0/22	3/50
Copper	mg/L	47/62	0.242	0.002	1.5	0/15	0/47
Lead	mg/L	53/72	0.0965	0.001	0.015	0/19	16/53
Mercury	mg/L	7/72	0.0008	0.001	0.011	0/65	0/7
Selenium	mg/L	32/72	0.0039	0.005	0.18	0/40	0/32
Silver	mg/L	8/72	0.0071	0.005	0.18	0/64	0/8
Zinc	mg/L	50/62	0.428	0.005	11	0/12	0/50
Pesticides/PCBs							
4,4'-DDD	µg/L	0/3	ND	1.0	0.28	1/3	0/0
4,4'-DDE	µg/L	0/3	ND	1.0	0.2	1/3	0/0
4,4'-DDT	µg/L	0/3	ND	1.0	0.2	1/3	0/0
Aldrin	µg/L	0/3	ND	1.0	0.004	3/3	0/0
Alpha-BHC	µg/L	0/3	ND	1.0	0.011	3/3	0/0
Alpha-chlordane	µg/L	0/3	ND	1.0	0.19	1/3	0/0
Beta-BHC	µg/L	0/3	ND	1.0	0.037	3/3	0/0
Chlordane (tech)	µg/L	0/3	ND	10.0	0.19	3/3	0/0
Delta-BHC	µg/L	0/3	ND	1.0	NA	-	-
Dieldrin	µg/L	0/3	ND	1.0	0.0042	3/3	0/0
Endosulfan I	µg/L	0/3	ND	1.0	220	0/3	0/0
Endosulfan II	µg/L	0/3	ND	1.0	220	0/3	0/0
Endosulfan sulfate	µg/L	0/3	ND	1.0	220	0/3	0/0

**Table A-8 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Utility Corridor**

Hart Crowser  
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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Endrin	µg/L	0/3	ND	1.0	11	0/3	0/0
Endrin aldehyde	µg/L	0/3	ND	1.0	11	0/3	0/0
Endrin ketone	µg/L	0/3	ND	1.0	11	0/3	0/0
Gamma-BHC (lindane)	µg/L	0/3	ND	1.0	0.052	3/3	0/0
Gamma-chlordane	µg/L	0/3	ND	1.0	0.19	1/3	0/0
Heptachlor	µg/L	0/3	ND	1.0	0.015	3/3	0/0
Heptachlor epoxide	µg/L	0/3	ND	1.0	0.0074	3/3	0/0
Methoxychlor	µg/L	0/3	ND	1.0	180	0/3	0/0
Toxaphene	µg/L	0/3	ND	10.0	0.061	3/3	0/0
<b>Semivolatiles</b>							
2,4,5-Trichlorophenol	µg/L	0/5	ND	50.0	3600	0/5	0/0
2,4,6-Trichlorophenol	µg/L	0/5	ND	50.0	3.6	5/5	0/0
2,4-Dichlorophenol	µg/L	0/5	ND	50.0	110	0/5	0/0
2,4-Dimethylphenol	µg/L	0/5	ND	100.0	730	0/5	0/0
2,4-Dinitrophenol	µg/L	0/5	ND	250.0	73	1/5	0/0
2,4-Dinitrotoluene	µg/L	0/5	ND	50.0	73	0/5	0/0
2,6-Dinitrotoluene	µg/L	0/5	ND	50.0	36	1/5	0/0
2-Chloronaphthalene	µg/L	0/5	ND	50.0	490	0/5	0/0
2-Chlorophenol	µg/L	0/5	ND	50.0	30	1/5	0/0
2-Methylnaphthalene	µg/L	2/5	41.4	50.0	NA	-	-
2-Methylphenol	µg/L	0/5	ND	100.0	1800	0/5	0/0
2-Nitroaniline	µg/L	0/5	ND	50.0	1	5/5	0/0
2-Nitrophenol	µg/L	0/5	ND	50.0	NA	-	-
3,3-Dichlorobenzidine	µg/L	0/5	ND	50.0	0.15	5/5	0/0
3-Nitroaniline	µg/L	0/5	ND	100.0	NA	-	-
4,6-dinitro-2-methylphenol	µg/L	0/5	ND	100.0	NA	-	-
4-Bromophenyl phenyl ether	µg/L	0/5	ND	50.0	NA	-	-
4-Chloroaniline	µg/L	0/5	ND	200.0	150	1/5	0/0
4-Chlorophenyl phenyl ether	µg/L	0/5	ND	50.0	NA	-	-
4-Chlorophenyl-3-methylphen	µg/L	0/5	ND	50.0	NA	-	-
4-Methylphenol	µg/L	0/5	ND	50.0	180	0/5	0/0
4-Nitroaniline	µg/L	0/5	ND	100.0	NA	-	-
4-Nitrophenol	µg/L	0/5	ND	250.0	NA	-	-
Acenaphthene	µg/L	30/67	13.2	50.0	370	0/37	0/30
Acenaphthylene	µg/L	1/59	0.4	50.0	370	0/58	0/1
Anthracene	µg/L	6/59	1.02	50.0	1800	0/53	0/6
Benzo(a)anthracene	µg/L	6/59	1.27	50.0	0.092	49/53	3/6

**Table A-8 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Utility Corridor**

Hart Crowser  
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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Benzo(a)pyrene	µg/L	4/59	0.203	50.0	0.0092	55/55	4/4
Benzo(b)fluoranthene	µg/L	5/60	0.547	50.0	0.092	50/55	3/5
Benzo(ghi)perylene	µg/L	4/59	0.1	50.0	180	0/55	0/4
Benzo(k)fluoranthene	µg/L	1/59	0.0678	50.0	0.92	6/58	0/1
Benzoic acid	µg/L	0/5	ND	500.0	150000	0/5	0/0
Benzyl alcohol	µg/L	0/5	ND	100.0	11000	0/5	0/0
Bis(2-chloroethoxy)methane	µg/L	0/5	ND	100.0	NA	-	-
Bis(2-chloroethyl)ether	µg/L	0/5	ND	50.0	0.0098	5/5	0/0
Bis(2-chloroisopropyl)ether	µg/L	0/5	ND	100.0	0.27	5/5	0/0
Bis(2-ethylhexyl)phthalate	µg/L	0/5	ND	100.0	4.8	5/5	0/0
Butyl benzyl phthalate	µg/L	0/5	ND	50.0	7300	0/5	0/0
Chrysene	µg/L	5/60	1.04	50.0	9.2	1/55	0/5
Di-n-butyl phthalate	µg/L	0/5	ND	50.0	3600	0/5	0/0
Di-n-octyl phthalate	µg/L	0/5	ND	50.0	1500	0/5	0/0
Dibenzo(a,h)anthracene	µg/L	0/59	ND	5.0	0.0092	59/59	0/0
Dibenzofuran	µg/L	0/5	ND	50.0	24	1/5	0/0
Diethyl phthalate	µg/L	0/5	ND	50.0	29000	0/5	0/0
Dimethyl phthalate	µg/L	0/5	ND	50.0	360000	0/5	0/0
Fluoranthene	µg/L	16/65	1.6	50.0	1500	0/49	0/16
Fluorene	µg/L	34/68	32.1	50.0	240	0/34	0/34
Hexachlorobenzene	µg/L	0/5	ND	50.0	0.042	5/5	0/0
Hexachlorobutadiene	µg/L	0/6	ND	10.0	0.86	6/6	0/0
Hexachlorocyclopentadiene	µg/L	0/5	ND	100.0	220	0/5	0/0
Hexachloroethane	µg/L	0/5	ND	100.0	4.8	5/5	0/0
Indeno(1,2,3-cd)pyrene	µg/L	4/59	0.1	50.0	0.092	50/55	1/4
Isophorone	µg/L	0/5	ND	50.0	71	0/5	0/0
N-nitrosodi-n-propylamine	µg/L	0/5	ND	100.0	0.0096	5/5	0/0
N-nitrosodiphenylamine	µg/L	0/5	ND	50.0	14	1/5	0/0
Naphthalene	µg/L	14/63	90.0	12.5	6.2	1/49	5/14
Nitrobenzene	µg/L	0/5	ND	50.0	3.4	5/5	0/0
Pentachlorophenol	µg/L	0/5	ND	100.0	0.56	5/5	0/0
Phenanthrene	µg/L	34/69	39.1	50.0	1800	0/35	0/34
Phenol	µg/L	0/5	ND	50.0	22000	0/5	0/0
Pyrene	µg/L	22/67	14.6	50.0	180	0/45	0/22
<b>Volatiles</b>							
1,1,1,2-Tetrachloroethane	µg/L	0/7	ND	5.0	0.43	7/7	0/0
1,1,1-Trichloroethane	µg/L	0/7	ND	5.0	3200	0/7	0/0



**Table A-8 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Utility Corridor**

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
1,1,2,2-Tetrachloroethane	µg/L	0/7	ND	5.0	0.055	7/7	0/0
1,1,2-Trichloroethane	µg/L	0/7	ND	5.0	0.2	7/7	0/0
1,1-Dichloroethane	µg/L	0/7	ND	5.0	810	0/7	0/0
1,1-Dichloroethene	µg/L	0/7	ND	5.0	340	0/7	0/0
1,1-Dichloropropene	µg/L	0/7	ND	5.0	NA	-	-
1,2,3-Trichlorobenzene	µg/L	0/7	ND	5.0	NA	-	-
1,2,3-Trichloropropane	µg/L	0/7	ND	5.0	0.0056	7/7	0/0
1,2,4-Trichlorobenzene	µg/L	0/7	ND	5.0	190	0/7	0/0
1,2,4-Trimethylbenzene	µg/L	3/7	64.5	5.0	12	0/4	2/3
1,2-Dibromo-3-chloropropane	µg/L	0/7	ND	10.0	0.048	7/7	0/0
1,2-Dibromoethane	µg/L	0/7	ND	5.0	0.00076	7/7	0/0
1,2-Dichlorobenzene	µg/L	0/7	ND	5.0	370	0/7	0/0
1,2-Dichloroethane	µg/L	0/7	ND	5.0	0.12	7/7	0/0
1,2-Dichloropropane	µg/L	0/7	ND	5.0	0.16	7/7	0/0
1,3,5-Trimethylbenzene	µg/L	3/7	36.2	5.0	12	0/4	2/3
1,3-Dichlorobenzene	µg/L	0/7	ND	5.0	5.5	0/7	0/0
1,3-Dichloropropane	µg/L	0/7	ND	5.0	NA	-	-
1,4-Dichlorobenzene	µg/L	0/7	ND	5.0	0.5	7/7	0/0
2,2-Dichloropropane	µg/L	0/7	ND	5.0	NA	-	-
2-Butanone	µg/L	0/7	ND	125.0	1900	0/7	0/0
2-Chlorotoluene	µg/L	0/7	ND	5.0	120	0/7	0/0
2-Hexanone	µg/L	0/7	ND	50.0	NA	-	-
4-Chlorotoluene	µg/L	0/7	ND	5.0	NA	-	-
4-Methyl-2-pentanone	µg/L	0/7	ND	25.0	160	0/7	0/0
Acetone	µg/L	0/7	ND	200.0	610	0/7	0/0
Benzene	µg/L	43/72	658.0	0.5	0.34	29/29	43/43
Bromobenzene	µg/L	0/7	ND	5.0	20	0/7	0/0
Bromochloromethane	µg/L	0/7	ND	5.0	NA	-	-
Bromodichloromethane	µg/L	0/7	ND	5.0	0.18	7/7	0/0
Bromoform	µg/L	0/7	ND	5.0	8.5	0/7	0/0
Bromomethane	µg/L	0/7	ND	50.0	8.7	7/7	0/0
Carbon tetrachloride	µg/L	0/7	ND	10.0	0.17	7/7	0/0
Chlorobenzene	µg/L	0/7	ND	5.0	110	0/7	0/0
Chloroethane	µg/L	0/7	ND	25.0	4.6	7/7	0/0
Chloroform	µg/L	0/7	ND	5.0	6.2	0/7	0/0
Chloromethane	µg/L	0/7	ND	25.0	1.5	7/7	0/0
Cis-1,2-dichloroethene	µg/L	0/7	ND	5.0	61	0/7	0/0

COP0020635

**Table A-8 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Utility Corridor**

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J-15302

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Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Cis-1,3-dichloropropene	µg/L	0/7	ND	5.0	0.4	7/7	0/0
Dibromochloromethane	µg/L	0/7	ND	5.0	0.13	7/7	0/0
Dibromomethane	µg/L	0/7	ND	5.0	61	0/7	0/0
Dichlorodifluoromethane	µg/L	0/7	ND	25.0	390	0/7	0/0
Ethylbenzene	µg/L	41/72	990.0	5.0	1300	0/31	0/41
Isopropylbenzene	µg/L	6/7	201.0	1.0	660	0/1	0/6
Methylene chloride	µg/L	0/7	ND	25.0	4.3	7/7	0/0
N-butylbenzene	µg/L	4/7	40.5	1.0	240	0/3	0/4
N-propylbenzene	µg/L	6/7	250.0	1.0	240	0/1	1/6
P-isopropyltoluene	µg/L	1/7	4.24	5.0	NA	-	-
Sec-butylbenzene	µg/L	3/7	16.6	5.0	240	0/4	0/3
Styrene	µg/L	0/7	ND	5.0	1600	0/7	0/0
Tert-butylbenzene	µg/L	1/7	6.18	5.0	240	0/6	0/1
Tetrachloroethene	µg/L	0/7	ND	5.0	0.66	7/7	0/0
Toluene	µg/L	39/73	29.8	12.5	720	0/34	0/39
Trans-1,2-dichloroethene	µg/L	0/7	ND	5.0	120	0/7	0/0
Trans-1,3-dichloropropene	µg/L	0/7	ND	5.0	0.4	7/7	0/0
Trichloroethene	µg/L	0/7	ND	5.0	0.028	7/7	0/0
Trichlorofluoromethane	µg/L	0/7	ND	25.0	1300	0/7	0/0
Vinyl chloride	µg/L	0/7	ND	5.0	0.02	7/7	0/0
Xylenes	µg/L	37/72	237.0	10.0	210	0/35	1/37

Report Name: COPC Screening of Chem Results-RA

**Footnotes:**

1 Criteria: EPA Region 9 Tap Water PRG (based on a carcinogenic risk of 1E-6 or an HQ of 1.0).

**COP0020636**

**Table A-9 - Data Quality Evaluation of Groundwater  
Chemistry Results  
Willbridge Terminal - Chevron Asphalt**

Hart Crowser  
J-15302

Date printed: 6/18/2003 Sheet 1 of 1

Analyte Group Analyte	Units	Detection Frequency	Maximum Detection	Maximum SQL	2002 PRGs		
					Criteria (1)	SQLs > Criteria	Detects > Criteria
Total Metals							
Arsenic	mg/L	5/5	0.423	NA	4.5E-05	0/0	5/5
Barium	mg/L	5/5	0.897	NA	2.6	0/0	0/5
Cadmium	mg/L	3/5	0.0029	0.0001	0.018	0/2	0/3
Chromium	mg/L	5/5	0.115	NA	0.11	0/0	1/5
Lead	mg/L	5/5	0.0847	NA	0.015	0/0	3/5
Mercury	mg/L	0/5	ND	0.0004	0.011	0/5	0/0
Selenium	mg/L	0/5	ND	0.01	0.18	0/5	0/0
Silver	mg/L	0/5	ND	0.01	0.18	0/5	0/0
Semivolatiles							
Acenaphthene	µg/L	1/5	1.04	10.0	370	0/4	0/1
Acenaphthylene	µg/L	0/5	ND	5.0	370	0/5	0/0
Anthracene	µg/L	0/5	ND	5.0	1800	0/5	0/0
Benzo(a)anthracene	µg/L	0/5	ND	5.0	0.092	2/5	0/0
Benzo(a)pyrene	µg/L	0/5	ND	1.0	0.0092	5/5	0/0
Benzo(b)fluoranthene	µg/L	0/5	ND	1.0	0.092	1/5	0/0
Benzo(ghi)perylene	µg/L	0/5	ND	1.0	180	0/5	0/0
Benzo(k)fluoranthene	µg/L	0/5	ND	1.0	0.92	1/5	0/0
Chrysene	µg/L	0/5	ND	5.0	9.2	0/5	0/0
Dibenzo(a,h)anthracene	µg/L	0/5	ND	2.0	0.0092	5/5	0/0
Fluoranthene	µg/L	0/5	ND	5.0	1500	0/5	0/0
Fluorene	µg/L	0/5	ND	5.0	240	0/5	0/0
Indeno(1,2,3-cd)pyrene	µg/L	0/5	ND	1.0	0.092	1/5	0/0
Naphthalene	µg/L	0/5	ND	5.0	6.2	0/5	0/0
Phenanthrene	µg/L	0/5	ND	10.0	1800	0/5	0/0
Pyrene	µg/L	0/5	ND	5.0	180	0/5	0/0
Volatiles							
Benzene	µg/L	0/5	ND	0.5	0.34	5/5	0/0
Ethylbenzene	µg/L	0/5	ND	0.5	1300	0/5	0/0
Toluene	µg/L	0/5	ND	0.5	720	0/5	0/0
Xylenes	µg/L	0/5	ND	1.0	210	0/5	0/0

Report Name: COPC Screening of Chem Results-RA

**Footnotes:**

1 Criteria: EPA Region 9 Tap Water PRG (based on a carcinogenic risk of 1E-6 or an HQ of 1.0).

**COP0020637**

Table A-10 - Willbridge Terminal Soil Data Sets

Area	Sample ID	Location	Sampling Date	Initial Depth in feet	Final Depth in feet	SVOAs	VOAs	Total Metals	TPH
<b>Kinder Morgan Data Set</b>									
Kinder Morgan	G-HS 1(2.5)	Surface	10/26/98	2.5		X	X		X
Kinder Morgan	G-HS 2(2)	Surface	10/26/98	2		X	X		X
Kinder Morgan	G-HS 3(2)	Surface	10/26/98	2		X	X		X
Kinder Morgan	G-HS 4(2)	Surface	10/26/98	2		X	X		X
Kinder Morgan	G-RF-2-(1.5)	Surface	10/29/98	1.5		X	X		
Kinder Morgan	G-RF-3-(2)	Surface	10/29/98	2		X	X		
Kinder Morgan	G-RF-4-(2.5)	Surface	10/29/98	2.5		X	X		
Kinder Morgan	G-SS-1	Surface	10/29/98	0	0.5	X	X		
Kinder Morgan	G-SS-10	Surface	10/28/98	0	0.5	X	X		
Kinder Morgan	G-SS-11	Surface	10/28/98	0	0.5	X	X		
Kinder Morgan	G-SS-12	Surface	10/29/98	0	0.5	X	X	X	
Kinder Morgan	G-SS-13	Surface	11/3/98	0	0.5	X	X		
Kinder Morgan	G-SS-14	Surface	11/3/98	0	0.5	X	X		
Kinder Morgan	G-SS-15	Surface	11/3/98	0	0.5	X	X		
Kinder Morgan	G-SS-16	Surface	10/28/98	0	0.5	X	X		
Kinder Morgan	G-SS-17	Surface	10/28/98	0	0.5	X	X		
Kinder Morgan	G-SS-18	Surface	11/3/98	0	0.5	X	X		
Kinder Morgan	G-SS-19	Surface	11/3/98	0	0.5	X	X		
Kinder Morgan	G-SS-2	Surface	10/29/98	0	0.5	X	X	X	
Kinder Morgan	G-SS-20	Surface	11/3/98	0	0.5	X	X		
Kinder Morgan	G-SS-21	Surface	10/29/98	0	0.5	X	X	X	
Kinder Morgan	G-SS-22	Surface	10/29/98	0	0.5	X	X		
Kinder Morgan	G-SS-3	Surface	10/28/98	0	0.5	X	X		
Kinder Morgan	G-SS-4	Surface	10/28/98	0	0.5	X	X		
Kinder Morgan	G-SS-5	Surface	10/28/98	0	0.5	X	X	X	
Kinder Morgan	G-SS-6	Surface	10/29/98	0	0.5	X	X		
Kinder Morgan	G-SS-7	Surface	10/29/98	0	0.5	X	X		
Kinder Morgan	G-SS-8	Surface	11/3/98	0	0.5	X	X	X	
Kinder Morgan	G-SS-9	Surface	10/29/98	0	0.5	X	X		
Kinder Morgan	G-HP 10(10)	Subsurface	11/4/98	10		X	X		
Kinder Morgan	G-HP 10(4)	Subsurface	11/4/98	4		X	X		
Kinder Morgan	G-HP 11 (4)	Subsurface	10/15/98	4		X	X		
Kinder Morgan	G-HP 11 (8)	Subsurface	10/15/98	8		X	X		
Kinder Morgan	G-HP 4 (11)	Subsurface	11/4/98	11		X	X		
Kinder Morgan	G-HP 5 (13)	Subsurface	11/2/98	13		X	X		
Kinder Morgan	G-HP 5 (7)	Subsurface	11/2/98	7		X	X		
Kinder Morgan	G-HP 6 (12)	Subsurface	11/2/98	12			X		
Kinder Morgan	G-HP 6 (4)	Subsurface	11/2/98	4		X	X		
Kinder Morgan	G-HP 6 (6)	Subsurface	11/2/98	6		X	X		
Kinder Morgan	G-HP 7 (6)	Subsurface	11/4/98	6		X	X		
Kinder Morgan	G-HP 7 (9)	Subsurface	11/4/98	9		X	X		
Kinder Morgan	G-HP 8 (6)	Subsurface	11/2/98	6		X	X		
Kinder Morgan	G-HP 8 (9)	Subsurface	11/2/98	9		X	X		
Kinder Morgan	G-HP 9 (12)	Subsurface	11/3/98	12		X	X		
Kinder Morgan	G-HP 9 (8)	Subsurface	11/3/98	8		X	X	X	
Kinder Morgan	G-HP-1 (10)	Subsurface	11/5/98	10		X	X		

Table A-10 - Willbridge Terminal Soil Data Sets

Area	Sample ID	Location	Sampling Date	Initial Depth in feet	Final Depth in feet	SVOAs	VOAs	Total Metals	TPH
Kinder Morgan	G-HP-1 (8)	Subsurface	11/5/98	8		X	X		
Kinder Morgan	G-HP-12(12)	Subsurface	4/1/99	12		X	X	X	
Kinder Morgan	G-HP-12(6)	Subsurface	4/1/99	6		X	X		
Kinder Morgan	G-HP-13(6)	Subsurface	3/31/99	6		X	X		
Kinder Morgan	G-HP-13(9)	Subsurface	3/31/99	9		X	X		
Kinder Morgan	G-HP-2 (10)	Subsurface	11/5/98	10		X	X		
Kinder Morgan	G-HP-2 (8)	Subsurface	11/5/98	8		X	X		
Kinder Morgan	G-HP-3 (11)	Subsurface	11/5/98	11		X	X		
Kinder Morgan	G-HP-3 (8)	Subsurface	11/5/98	8		X	X		
Kinder Morgan	G-HP-4 (8)	Subsurface	11/4/98	8		X	X		
Kinder Morgan	G-HS 1(5)	Subsurface	10/26/98	5		X	X		X
Kinder Morgan	G-HS 2(4)	Subsurface	10/26/98	4		X	X		X
Kinder Morgan	G-HS 3(4)	Subsurface	10/26/98	4		X	X		X
Kinder Morgan	G-HS 4(4)	Subsurface	10/26/98	4		X	X		X
Kinder Morgan	G-RF 1 (8)	Subsurface	10/13/98	8		X	X		
Kinder Morgan	G-RF-2-(3.5)	Subsurface	10/29/98	3.5		X	X		
Kinder Morgan	G-RF-3-(9)	Subsurface	10/29/98	9		X	X		
Kinder Morgan	G-RF-4-(8.5)	Subsurface	10/29/98	8.5		X	X		
<b>Chevron Data Set</b>									
Chevron	C-SS-1	Surface	2/26/99	0	0.5	X	X		
Chevron	C-SS-10	Surface	10/22/98	0	0.5	X	X		
Chevron	C-SS-11	Surface	10/22/98	0	0.5	X	X		
Chevron	C-SS-12	Surface	10/23/98	0	0.5	X	X		
Chevron	C-SS-13	Surface	11/4/98	0	0.5	X	X		
Chevron	C-SS-14	Surface	11/4/98	0	0.5	X	X	X	
Chevron	C-SS-15	Surface	10/22/98	0	0.5	X	X		
Chevron	C-SS-16	Surface	11/4/98	0	0.5	X	X		
Chevron	C-SS-2	Surface	10/22/98	0	0.5	X	X		
Chevron	C-SS-3	Surface	2/26/99	0	0.5	X	X		
Chevron	C-SS-4	Surface	10/22/98	0	0.5	X	X	X	
Chevron	C-SS-5	Surface	11/4/98	0	0.5	X	X		
Chevron	C-SS-6	Surface	11/4/98	0	0.5	X	X		
Chevron	C-SS-7	Surface	10/23/98	0	0.5	X	X		
Chevron	C-SS-8	Surface	11/4/98	0	0.5	X	X	X	
Chevron	C-SS-9	Surface	10/22/98	0	0.5	X	X	X	
Chevron	C-HP-1 (12)	Subsurface	10/15/98	12		X	X		
Chevron	C-HP-1 (4)	Subsurface	10/15/98	4		X	X		
Chevron	C-HP-2 (12)	Subsurface	10/15/98	12		X	X		
Chevron	C-HP-2 (4)	Subsurface	10/15/98	4		X	X		
Chevron	C-HP-3 (11)	Subsurface	10/14/98	11		X	X		
Chevron	C-HP-3 (8)	Subsurface	10/14/98	8		X	X		
Chevron	C-RF-1-(10)	Subsurface	10/13/98	10		X	X		
Chevron	C-RF-1-(4)	Subsurface	10/13/98	4		X	X		
Chevron	C-RF-2-(8)	Subsurface	10/13/98	8		X	X		
Chevron	C-RF-3 (4)	Subsurface	10/13/98	4		X	X		
Chevron	C-RF-3 (8)	Subsurface	10/13/98	8		X	X		

Table A-10 - Willbridge Terminal Soil Data Sets

Area	Sample ID	Location	Sampling Date	Initial Depth in feet	Final Depth in feet	SVOAs	VOAs	Total Metals	TPH
<b>Conoco Phillips Data Set</b>									
Conoco Phillips	T-RF-1 (1.5)	Surface	10/12/98	1.5		X	X		
Conoco Phillips	T-SS-1	Surface	11/5/98	0	0.5	X	X		
Conoco Phillips	T-SS-10	Surface	11/5/98	0	0.5	X	X		
Conoco Phillips	T-SS-11	Surface	11/6/98	0	0.5	X	X	X	
Conoco Phillips	T-SS-12	Surface	11/6/98	0	0.5	X	X		
Conoco Phillips	T-SS-13	Surface	11/5/98	0	0.5	X	X		
Conoco Phillips	T-SS-14	Surface	11/6/98	0	0.5	X	X	X	
Conoco Phillips	T-SS-15	Surface	11/5/98	0	0.5	X	X		
Conoco Phillips	T-SS-16	Surface	11/5/98	0	0.5	X	X		
Conoco Phillips	T-SS-2	Surface	11/5/98	0	0.5	X	X		
Conoco Phillips	T-SS-3	Surface	11/5/98	0	0.5	X	X	X	
Conoco Phillips	T-SS-4	Surface	11/6/98	0	0.5	X	X		
Conoco Phillips	T-SS-5	Surface	11/6/98	0	0.5	X	X		
Conoco Phillips	T-SS-6	Surface	11/5/98	0	0.5	X	X	X	
Conoco Phillips	T-SS-7	Surface	11/5/98	0	0.5	X	X		
Conoco Phillips	T-SS-8	Surface	11/5/98	0	0.5	X	X		
Conoco Phillips	T-SS-9	Surface	11/5/98	0	0.5	X	X		
Conoco Phillips	T-HP-1 (10)	Subsurface	11/3/98	10		X	X		
Conoco Phillips	T-HP-2 (11)	Subsurface	11/3/98	11		X	X		
Conoco Phillips	T-HP-3 (4)	Subsurface	11/4/98	4		X	X		
Conoco Phillips	T-HP-4 (8)	Subsurface	11/3/98	8		X	X		
Conoco Phillips	T-HP-5 (10)	Subsurface	10/14/98	10		X	X		
Conoco Phillips	T-HP-5 (4)	Subsurface	10/14/98	4		X	X		
Conoco Phillips	T-HP-6 (12)	Subsurface	10/14/98	12		X	X		
Conoco Phillips	T-HP-6 (3.5)	Subsurface	10/14/98	3.5		X	X	X	
Conoco Phillips	T-HP-7 (12)	Subsurface	10/14/98	12		X	X		
Conoco Phillips	T-HP-7 (4)	Subsurface	10/14/98	4		X	X		
Conoco Phillips	T-HS-1 (8)	Subsurface	10/27/98	8			X		X
Conoco Phillips	T-HS-2 (8)	Subsurface	10/27/98	8			X		X
Conoco Phillips	T-HS-3 (12)	Subsurface	10/27/98	12			X		X
Conoco Phillips	T-HS-4 (12)	Subsurface	11/5/98	12			X		X
Conoco Phillips	T-RF 2 (8)	Subsurface	10/13/98	8		X	X		
Conoco Phillips	T-RF-1 (8)	Subsurface	10/12/98	8		X	X		
<b>Utility Corridor Data Set</b>									
Conoco Phillips	T-HP-1 (10)	Subsurface	11/3/98	10		X	X		
Conoco Phillips	T-HP-2 (11)	Subsurface	11/3/98	11		X	X		
Conoco Phillips	T-HP-3 (4)	Subsurface	11/4/98	4		X	X		
Conoco Phillips	T-HP-4 (8)	Subsurface	11/3/98	8		X	X		
Kinder Morgan	G-HP-1 (10)	Subsurface	11/5/98	10		X	X		
Kinder Morgan	G-HP-1 (8)	Subsurface	11/5/98	8		X	X		
Kinder Morgan	G-HP-12(12)	Subsurface	4/1/99	12		X	X	X	
Kinder Morgan	G-HP-12(6)	Subsurface	4/1/99	6		X	X		
Kinder Morgan	G-HP-13(6)	Subsurface	3/31/99	6		X	X		
Kinder Morgan	G-HP-13(9)	Subsurface	3/31/99	9		X	X		
Kinder Morgan	G-HP-2 (10)	Subsurface	11/5/98	10		X	X		
Kinder Morgan	G-HP-2 (8)	Subsurface	11/5/98	8		X	X		

Table A-10 - Willbridge Terminal Soil Data Sets

Sheet 4 of 4

Area	Sample ID	Location	Sampling Date	Initial Depth in feet	Final Depth in feet	SVOAs	VOAs	Total Metals	TPH
Kinder Morgan	G-HP-3 (11)	Subsurface	11/5/98	11		X	X		
Kinder Morgan	G-HP-3 (8)	Subsurface	11/5/98	8		X	X		
Kinder Morgan	G-HP-4 (8)	Subsurface	11/4/98	8		X	X		
Kinder Morgan	G-HP-1 (14)	Saturated	11/5/98	14		X	X	X	
Kinder Morgan	G-HP-3 (14)	Saturated	11/5/98	14		X	X	X	
Utility Borings	UB-1 (12)	Subsurface	3/31/99	12		X	X		
Utility Borings	UB-1 (16)	Subsurface	3/31/99	16		X	X		
Utility Borings	UB-2 (16)	Subsurface	3/31/99	16		X	X		
Utility Borings	UB-2 (8)	Subsurface	3/31/99	8		X	X		
Utility Borings	UB-3 (11)	Subsurface	3/31/99	11		X	X	X	
Utility Borings	UB-3 (4)	Subsurface	3/31/99	4		X	X		
Utility Borings	UB-3 (7)	Subsurface	3/31/99	7		X	X		
Utility Borings	UB-4 (12)	Subsurface	3/31/99	12		X	X	X	
Utility Borings	UB-4 (6)	Subsurface	3/31/99	6		X	X		
Utility Borings	UB-4 (9)	Subsurface	3/31/99	9		X	X		
Utility Borings	UB-5 (12)	Subsurface	4/1/99	12		X	X	X	
Utility Borings	UB-5 (5)	Subsurface	4/1/99	5		X	X		
Utility Borings	UB-5 (8)	Subsurface	4/1/99	8		X	X		
Utility Borings	UB-6 (11)	Subsurface	3/31/99	11		X	X	X	
Utility Borings	UB-6 (7)	Subsurface	3/31/99	7		X	X		
Utility Borings	UB-7 (16)	Subsurface	4/1/99	16		X	X	X	
Utility Borings	UB-7 (7)	Subsurface	4/1/99	7		X	X		
Utility Borings	UB-7 (9)	Subsurface	4/1/99	9		X	X		
Utility Borings	UB-8 (11)	Subsurface	4/1/99	11		X	X		
Utility Borings	UB-8 (16)	Subsurface	4/1/99	16		X	X	X	
Utility Borings	UB-8 (8)	Subsurface	4/1/99	8		X	X		
<b>Landscape Worker Data Sets</b>									
Chevron	C-SS-14	Surface	11/4/98	0	0.5	X	X	X	
Chevron	C-SS-15	Surface	10/22/98	0	0.5	X	X		
Chevron	C-RF-1-(4)	Subsurface	10/13/98	4		X	X		
Chevron	C-RF-3 (4)	Subsurface	10/13/98	4		X	X		
Kinder Morgan	G-RF-2-(1.5)	Surface	10/29/98	1.5		X	X		
Kinder Morgan	G-RF-3-(2)	Surface	10/29/98	2		X	X		
Kinder Morgan	G-RF-4-(2.5)	Surface	10/29/98	2.5		X	X		
Kinder Morgan	G-SS-13	Surface	11/3/98	0	0.5	X	X		
Kinder Morgan	G-SS-14	Surface	11/3/98	0	0.5	X	X		

Table A-11 - Willbridge Terminal Groundwater Data Sets

Sheet 1 of 15

Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
<b>Kinder Morgan Data Set</b>									
Kinder Morgan	MW-1	MW-1	10/28/97	X	X	X			
Kinder Morgan	MW-10	MW-10	10/27/97	X	X	X	X		
Kinder Morgan	MW-10	MW-10	12/9/98	X	X	X	X		
Kinder Morgan	MW-10	MW-10	12/1/00	X	X	X			
Kinder Morgan	MW-10	MW-10	2/16/00	X	X	X			
Kinder Morgan	MW-10	MW-10	2/22/01	X	X	X			
Kinder Morgan	MW-10	MW-10	5/16/01	X	X	X			
Kinder Morgan	MW-10	MW-10	5/31/00		X	X			
Kinder Morgan	MW-10	MW-10	8/24/00	X	X	X			
Kinder Morgan	MW-11	MW-11	12/9/98	X	X	X			
Kinder Morgan	MW-11	MW-11	12/1/00	X	X	X			
Kinder Morgan	MW-11	MW-11	2/16/00	X	X	X			
Kinder Morgan	MW-11	MW-11	2/22/01	X	X	X			
Kinder Morgan	MW-11	MW-11	5/16/01	X	X	X			
Kinder Morgan	MW-11	MW-11	5/31/00	X	X	X			
Kinder Morgan	MW-11	MW-11	8/24/00	X	X	X			
Kinder Morgan	MW-12	MW-12	10/28/97	X	X	X			
Kinder Morgan	MW-13	MW-13	10/27/97	X		X	X		
Kinder Morgan	MW-13	MW-13	10/27/98		X				
Kinder Morgan	MW-13	MW-13	12/9/98	X	X	X	X		
Kinder Morgan	MW-13	MW-13	12/1/00		X	X			
Kinder Morgan	MW-13	MW-13	2/16/00		X	X			
Kinder Morgan	MW-13	MW-13	2/22/01	X	X	X			
Kinder Morgan	MW-13	MW-13	5/16/01	X	X	X			
Kinder Morgan	MW-13	MW-13	5/31/00			X			
Kinder Morgan	MW-13	MW-13	8/24/00	X	X	X			
Kinder Morgan	MW-15	MW-15	10/30/97	X	X	X	X		
Kinder Morgan	MW-15	MW-15	12/1/00		X	X			
Kinder Morgan	MW-15	MW-15	12/10/98	X	X	X			
Kinder Morgan	MW-15	MW-15	2/17/00	X	X	X			
Kinder Morgan	MW-15	MW-15	2/22/01	X	X	X			
Kinder Morgan	MW-15	MW-15	5/16/01	X	X	X			
Kinder Morgan	MW-15	MW-15	5/30/00			X			
Kinder Morgan	MW-15	MW-15	5/31/00						
Kinder Morgan	MW-15	MW-15	8/24/00	X	X	X			
Kinder Morgan	MW-17	MW-17	10/30/97	X	X	X			
Kinder Morgan	MW-18	MW-18	10/30/97	X	X	X			
Kinder Morgan	MW-20	MW-20	10/28/97	X	X	X	X		
Kinder Morgan	MW-21	MW-21	10/29/97	X	X	X	X		
Kinder Morgan	MW-21	MW-21	12/8/98	X	X	X	X		
Kinder Morgan	MW-21	MW-21	12/1/00		X	X			
Kinder Morgan	MW-21	MW-21	2/17/00		X	X			
Kinder Morgan	MW-21	MW-21	2/22/01	X	X	X			
Kinder Morgan	MW-21	MW-21	5/16/01	X	X	X			



**Table A-11 - Willbridge Terminal Groundwater Data Sets**

Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
Kinder Morgan	MW-21	MW-21	5/30/00			X			
Kinder Morgan	MW-21	MW-21	8/23/00	X	X	X			
Kinder Morgan	MW-22	MW-22	10/29/97	X	X	X			
Kinder Morgan	MW-22	MW-22	12/9/98	X	X	X			
Kinder Morgan	MW-22	MW-22	12/1/00	X	X	X			
Kinder Morgan	MW-22	MW-22	2/17/00	X	X	X			
Kinder Morgan	MW-22	MW-22	2/21/01			X			
Kinder Morgan	MW-22	MW-22	5/16/01			X			
Kinder Morgan	MW-22	MW-22	5/30/00	X	X	X			
Kinder Morgan	MW-22	MW-22	8/23/00	X	X	X			
Kinder Morgan	MW-23	MW-23	11/30/00			X			
Kinder Morgan	MW-23	MW-23	12/9/98	X	X	X			
Kinder Morgan	MW-23	MW-23	12/1/00						
Kinder Morgan	MW-23	MW-23	2/17/00			X			
Kinder Morgan	MW-23	MW-23	2/22/01	X	X	X			
Kinder Morgan	MW-23	MW-23	5/16/01			X			
Kinder Morgan	MW-23	MW-23	5/30/00			X			
Kinder Morgan	MW-23	MW-23	8/23/00			X			
Kinder Morgan	MW-25	MW-25	3/14/02	X	X	X			
Kinder Morgan	MW-25	MW-25	3/18/03	X	X	X			
Kinder Morgan	MW-25	MW-25	9/21/01	X	X	X			
Kinder Morgan	MW-25	MW-25	9/27/02	X	X	X			
Kinder Morgan	MW-26	MW-26	12/8/98	X	X	X			
Kinder Morgan	MW-26	MW-26	12/1/00	X	X	X			
Kinder Morgan	MW-26	MW-26	2/17/00	X	X	X			
Kinder Morgan	MW-26	MW-26	2/21/01			X			
Kinder Morgan	MW-26	MW-26	3/13/02						
Kinder Morgan	MW-26	MW-26	3/18/03	X	X	X			
Kinder Morgan	MW-26	MW-26	5/17/01	X	X	X			
Kinder Morgan	MW-26	MW-26	5/30/00	X	X	X			
Kinder Morgan	MW-26	MW-26	8/23/00	X	X	X			
Kinder Morgan	MW-26	MW-26	9/18/01						
Kinder Morgan	MW-26	MW-26	9/27/02	X	X	X			
Kinder Morgan	MW-27	MW-27	10/29/97	X	X	X			
Kinder Morgan	MW-28	MW-28	11/30/00			X			
Kinder Morgan	MW-28	MW-28	12/1/00						
Kinder Morgan	MW-28	MW-28	2/16/00	X	X	X			
Kinder Morgan	MW-28	MW-28	2/21/01			X			
Kinder Morgan	MW-28	MW-28	5/16/01			X			
Kinder Morgan	MW-28	MW-28	5/30/00			X			
Kinder Morgan	MW-28	MW-28	8/23/00			X			
Kinder Morgan	MW-28	MW-28	8/24/00						
Kinder Morgan	MW-29	MW-29	10/29/97	X	X	X			
Kinder Morgan	MW-3	MW-3	10/28/97	X	X	X			
Kinder Morgan	MW-30	MW-30	10/29/97	X	X	X			
Kinder Morgan	MW-30	MW-30	12/8/98	X	X	X			
Kinder Morgan	MW-31	MW-31	10/29/97	X	X	X			

Table A-11 - Willbridge Terminal Groundwater Data Sets

Sheet 3 of 15

Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
Kinder Morgan	MW-31	MW-31	12/8/98	X	X	X			
Kinder Morgan	MW-31	MW-31	12/1/00	X	X	X			
Kinder Morgan	MW-31	MW-31	2/16/00	X	X	X			
Kinder Morgan	MW-31	MW-31	2/22/01	X	X	X			
Kinder Morgan	MW-31	MW-31	5/17/01	X	X	X			
Kinder Morgan	MW-31	MW-31	5/30/00			X			
Kinder Morgan	MW-31	MW-31	8/23/00	X	X	X			
Kinder Morgan	MW-32	MW-32	10/29/97	X	X	X	X		
Kinder Morgan	MW-32	MW-32	12/8/98	X	X	X			
Kinder Morgan	MW-32	MW-32	12/1/00	X	X	X			
Kinder Morgan	MW-32	MW-32	2/16/00		X	X			
Kinder Morgan	MW-32	MW-32	2/22/01	X	X	X			
Kinder Morgan	MW-32	MW-32	5/16/01	X	X	X			
Kinder Morgan	MW-32	MW-32	5/30/00			X			
Kinder Morgan	MW-32	MW-32	8/23/00	X	X	X			
Kinder Morgan	MW-33	MW-33	10/31/97	X		X	X		
Kinder Morgan	MW-33	MW-33	10/31/98		X				
Kinder Morgan	MW-33	MW-33	11/30/00	X	X	X			
Kinder Morgan	MW-33	MW-33	12/11/98	X	X	X	X		
Kinder Morgan	MW-33	MW-33	2/16/00		X	X			
Kinder Morgan	MW-33	MW-33	2/22/01	X	X	X			
Kinder Morgan	MW-33	MW-33	3/14/02	X	X	X			
Kinder Morgan	MW-33	MW-33	3/18/03	X	X	X			
Kinder Morgan	MW-33	MW-33	5/16/01	X	X	X			
Kinder Morgan	MW-33	MW-33	5/30/00			X			
Kinder Morgan	MW-33	MW-33	8/24/00	X	X	X			
Kinder Morgan	MW-33	MW-33	9/21/01	X	X	X			
Kinder Morgan	MW-33	MW-33	9/27/02	X	X	X			
Kinder Morgan	MW-34	MW-34	10/31/97	X		X			
Kinder Morgan	MW-34	MW-34	10/31/98		X				
Kinder Morgan	MW-34	MW-34	3/14/02	X	X	X			
Kinder Morgan	MW-34	MW-34	3/18/03	X	X	X			
Kinder Morgan	MW-34	MW-34	9/21/01	X	X	X			
Kinder Morgan	MW-34	MW-34	9/27/02	X	X	X			
Kinder Morgan	MW-36	MW-36	10/31/97	X	X	X			
Kinder Morgan	MW-36	MW-36	11/30/00	X	X	X			
Kinder Morgan	MW-36	MW-36	12/10/98	X	X	X			
Kinder Morgan	MW-36	MW-36	2/16/00	X	X	X			
Kinder Morgan	MW-36	MW-36	2/21/01	X	X	X			
Kinder Morgan	MW-36	MW-36	3/13/02	X	X	X			
Kinder Morgan	MW-36	MW-36	3/18/03	X	X	X			
Kinder Morgan	MW-36	MW-36	5/16/01	X	X	X			
Kinder Morgan	MW-36	MW-36	5/31/00	X		X			
Kinder Morgan	MW-36	MW-36	8/24/00	X	X	X			
Kinder Morgan	MW-36	MW-36	9/21/01	X	X	X			
Kinder Morgan	MW-37	MW-37	2/21/11	X					
Kinder Morgan	MW-37	MW-37	10/31/97	X	X	X	X		

Table A-11 - Willbridge Terminal Groundwater Data Sets

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Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
Kinder Morgan	MW-37	MW-37	11/30/00	X	X	X			
Kinder Morgan	MW-37	MW-37	12/10/98	X	X	X	X		
Kinder Morgan	MW-37	MW-37	2/16/00	X	X	X			
Kinder Morgan	MW-37	MW-37	2/21/11	X					
Kinder Morgan	MW-37	MW-37	2/21/01	X	X	X			
Kinder Morgan	MW-37	MW-37	3/13/02						
Kinder Morgan	MW-37	MW-37	3/18/03	X	X	X			
Kinder Morgan	MW-37	MW-37	5/16/01	X	X	X			
Kinder Morgan	MW-37	MW-37	5/30/00	X	X	X			
Kinder Morgan	MW-37	MW-37	8/24/00	X	X	X			
Kinder Morgan	MW-37	MW-37	9/21/01	X	X	X			
Kinder Morgan	MW-37	MW-37	9/27/02	X	X	X			
Kinder Morgan	MW-39	MW-39	12/10/98	X	X	X	X		
Kinder Morgan	MW-4	MW-4	10/28/97	X	X	X			
Kinder Morgan	MW-4	MW-4	12/9/98	X	X	X			
Kinder Morgan	MW-40	MW-40	11/30/00	X	X	X			
Kinder Morgan	MW-40	MW-40	12/10/98	X	X	X			
Kinder Morgan	MW-40	MW-40	2/16/00	X	X	X			
Kinder Morgan	MW-40	MW-40	2/21/01	X	X	X			
Kinder Morgan	MW-40	MW-40	3/13/02	X	X	X			
Kinder Morgan	MW-40	MW-40	3/18/03	X	X	X			
Kinder Morgan	MW-40	MW-40	5/16/01	X	X	X			
Kinder Morgan	MW-40	MW-40	5/30/00	X		X			
Kinder Morgan	MW-40	MW-40	8/24/00	X	X	X			
Kinder Morgan	MW-40	MW-40	9/21/01	X	X	X			
Kinder Morgan	MW-40	MW-40	9/27/02	X	X	X			
Kinder Morgan	MW-6	MW-6	10/28/97	X	X	X			
Kinder Morgan	MW-8	MW-8	10/30/97	X	X	X			
Kinder Morgan	MW-8	MW-8	12/1/00	X	X	X			
Kinder Morgan	MW-8	MW-8	12/10/98	X	X	X			
Kinder Morgan	MW-8	MW-8	2/16/00	X	X	X			
Kinder Morgan	MW-8	MW-8	2/22/01	X	X	X			
Kinder Morgan	MW-8	MW-8	3/14/02	X	X	X			
Kinder Morgan	MW-8	MW-8	3/18/03	X	X	X			
Kinder Morgan	MW-8	MW-8	5/16/01	X	X	X			
Kinder Morgan	MW-8	MW-8	5/31/00		X	X			
Kinder Morgan	MW-8	MW-8	8/24/00	X	X	X			
Kinder Morgan	MW-8	MW-8	9/21/01	X	X	X			
Kinder Morgan	MW-8	MW-8	9/27/02	X	X	X			
Kinder Morgan	MW-9	MW-9	10/27/97	X		X			
Kinder Morgan	MW-9	MW-9	10/27/98		X				
<b>Chevron Data Sets</b>									
Chevron - NCE	B-10	B-10	10/21/97	X	X	X			
Chevron - NCE	B-10	B-10	11/24/98	X	X	X			
Chevron - NCE	B-10	B-10	3/20/03	X	X	X			

Table A-11 - Willbridge Terminal Groundwater Data Sets

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Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
Chevron - NCE	B-11	B-11	10/21/97	X	X	X			
Chevron - NCE	B-11	B-11	11/23/98	X	X	X			
Chevron - NCE	B-14	B-14	10/22/97	X	X	X	X		
Chevron - NCE	B-14	B-14	11/25/98	X	X	X	X		
Chevron - NCE	B-20	B-20	3/20/03	X	X	X			
Chevron - NCE	B-21	B-21	3/20/03	X	X	X			
Chevron - NCE	B-28	B-28	10/23/97	X	X	X			
Chevron - NCE	B-28	B-28	11/24/98	X	X	X			
Chevron - NCE	B-28	B-28	3/20/03	X	X	X			
Chevron - NCE	B-29	B-29	10/22/97	X	X	X			
Chevron - NCE	B-29	B-29	3/20/03	X	X	X			
Chevron - NCE	B-30	B-30	10/23/97	X	X	X	X		
Chevron - NCE	B-30	B-30	11/24/98	X	X	X	X		
Chevron - NCE	B-30	B-30	3/20/03	X	X	X			
Chevron - NCE	B-7	B-7	10/22/97	X	X	X			
Chevron - NCE	B-7	B-7	11/24/98	X	X	X			
Chevron - NCE	B-7	B-7	3/20/03	X	X	X			
Chevron - NCE	B-9	B-9	10/22/97	X	X	X	X		
Chevron - NCE	B-9	B-9	12/11/98	X	X	X	X		
Chevron - NCE	B-9	B-9	3/20/03	X	X	X			
Chevron - NCE	CR-1	CR-1	3/20/03	X	X	X			
Chevron - NCE	CR-11	CR-11	10/23/97	X	X	X			
Chevron - NCE	CR-9	CR-9	10/23/97	X	X	X			
Chevron - NCE	CR-9	CR-9	11/25/98	X	X	X	X		
Chevron - NCE	B-15	B-15	10/22/97	X	X	X			
Chevron - NCE	B-19	B-19	10/22/97	X	X	X			
Chevron - NCE	B-19	B-19	3/20/03	X	X	X			
Chevron - NCE	B-24	B-24	10/23/97	X	X	X	X		
Chevron - NCE	B-24	B-24	11/23/98	X	X				
Chevron - NCE	B-26	B-26	10/21/97	X	X	X			
Chevron - NCE	B-31	B-31	10/23/97	X	X	X			
Chevron - NCE	B-32	B-32	10/22/97	X	X	X			
Chevron - NCE	B-32	B-32	3/20/03	X	X	X			
Chevron - NCE	B-33	B-33	3/20/03	X	X	X			
Chevron - NCE	B-50	B-50	3/20/03	X	X				
Chevron - NCE	EX-1	EX-1	11/25/98	X	X	X	X		
Chevron - NCE	B-10	B-10	11/30/00	X	X	X			
Chevron - NCE	B-10	B-10	2/18/00	X	X	X			
Chevron - NCE	B-10	B-10	2/23/01	X	X	X			
Chevron - NCE	B-10	B-10	3/21/02	X	X	X			
Chevron - NCE	B-10	B-10	5/17/01	X	X	X			
Chevron - NCE	B-10	B-10	5/23/00	X	X	X			
Chevron - NCE	B-10	B-10	8/25/00	X	X	X			
Chevron - NCE	B-10	B-10	9/19/01	X	X	X			
Chevron - NCE	B-10	B-10	9/24/02	X	X	X			
Chevron - NCE	B-11	B-11	11/30/00	X	X	X			
Chevron - NCE	B-11	B-11	2/18/00	X	X	X			

Table A-11 - Willbridge Terminal Groundwater Data Sets

Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
Chevron - NCE	B-11	B-11	2/22/01	X	X	X			
Chevron - NCE	B-11	B-11	5/17/01	X	X	X			
Chevron - NCE	B-11	B-11	5/23/00	X	X	X			
Chevron - NCE	B-11	B-11	8/25/00	X	X	X			
Chevron - NCE	B-14	B-14	11/30/00	X	X	X			
Chevron - NCE	B-14	B-14	2/18/00	X	X	X			
Chevron - NCE	B-14	B-14	2/22/01	X	X	X			
Chevron - NCE	B-14	B-14	5/17/01	X	X	X			
Chevron - NCE	B-14	B-14	5/23/00	X	X	X			
Chevron - NCE	B-14	B-14	8/25/00	X	X	X			
Chevron - NCE	B-21	B-21	3/21/02	X	X	X			
Chevron - NCE	B-21	B-21	9/19/01	X	X	X			
Chevron - NCE	B-21	B-21	9/24/02	X	X	X			
Chevron - NCE	B-28	B-28	11/30/00	X	X	X			
Chevron - NCE	B-28	B-28	2/18/00	X	X	X			
Chevron - NCE	B-28	B-28	2/23/01	X	X	X			
Chevron - NCE	B-28	B-28	3/21/02	X	X	X			
Chevron - NCE	B-28	B-28	5/17/01	X	X	X			
Chevron - NCE	B-28	B-28	5/23/00			X			
Chevron - NCE	B-28	B-28	8/25/00	X	X	X			
Chevron - NCE	B-28	B-28	9/20/01	X	X	X			
Chevron - NCE	B-28	B-28	9/24/02	X	X	X			
Chevron - NCE	B-29	B-29	3/21/02	X	X	X			
Chevron - NCE	B-29	B-29	9/20/01	X	X	X			
Chevron - NCE	B-29	B-29	9/24/02	X	X	X			
Chevron - NCE	B-30	B-30	11/30/00	X	X	X			
Chevron - NCE	B-30	B-30	2/18/00	X	X	X			
Chevron - NCE	B-30	B-30	2/23/01	X	X	X			
Chevron - NCE	B-30	B-30	3/21/02	X	X	X			
Chevron - NCE	B-30	B-30	5/17/01	X	X	X			
Chevron - NCE	B-30	B-30	5/23/00	X	X	X			
Chevron - NCE	B-30	B-30	8/25/00	X	X	X			
Chevron - NCE	B-30	B-30	9/20/01	X	X	X			
Chevron - NCE	B-30	B-30	9/24/02	X	X	X			
Chevron - NCE	B-7	B-7	11/30/00			X			
Chevron - NCE	B-7	B-7	2/18/00	X	X	X			
Chevron - NCE	B-7	B-7	2/22/01	X	X	X			
Chevron - NCE	B-7	B-7	5/17/01	X	X	X			
Chevron - NCE	B-7	B-7	5/23/00	X	X	X			
Chevron - NCE	B-7	B-7	8/25/00			X			
Chevron - NCE	B-9	B-9	11/30/00	X	X	X			
Chevron - NCE	B-9	B-9	2/18/00						
Chevron - NCE	B-9	B-9	2/22/01	X	X	X			
Chevron - NCE	B-9	B-9	3/21/02	X	X	X			
Chevron - NCE	B-9	B-9	5/17/01	X	X	X			
Chevron - NCE	B-9	B-9	5/23/00	X	X	X			
Chevron - NCE	B-9	B-9	8/25/00	X	X	X			

Table A-11 - Willbridge Terminal Groundwater Data Sets

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Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
Chevron - NCE	B-9	B-9	9/19/01	X	X	X			
Chevron - NCE	B-9	B-9	9/24/02	X	X	X			
Chevron - NCE	CR-1	CR-1	3/21/02	X	X	X			
Chevron - NCE	CR-1	CR-1	9/20/01	X	X	X			
Chevron - NCE	CR-1	CR-1	9/21/01			X			
Chevron - NCE	CR-1	CR-1	9/24/02	X	X	X			
Chevron - NCE	CR-11	CR-11	11/30/00			X			
Chevron - NCE	CR-11	CR-11	2/18/00	X	X	X			
Chevron - NCE	CR-11	CR-11	2/22/01	X	X	X			
Chevron - NCE	CR-11	CR-11	5/16/01	X	X	X			
Chevron - NCE	CR-11	CR-11	5/23/00		X	X			
Chevron - NCE	CR-11	CR-11	8/25/00	X	X	X			
Chevron - NCE	CR-9	CR-9	11/30/00	X	X	X			
Chevron - NCE	CR-9	CR-9	2/18/00			X			
Chevron - NCE	CR-9	CR-9	2/22/01	X	X	X			
Chevron - NCE	CR-9	CR-9	5/16/01	X	X	X			
Chevron - NCE	CR-9	CR-9	5/23/00	X		X			
Chevron - NCE	CR-9	CR-9	8/25/00	X	X	X			
Chevron Ethanol	B-14	B-14	7/17/01						X
Chevron Ethanol	CR10	CR10	4/5/01	X	X			X	X
Chevron Ethanol	CR10	CR10	6/13/01						X
Chevron Ethanol	CR-10	CR10	10/24/01	X	X			X	X
Chevron Ethanol	CR-10	CR10	2/19/02	X	X			X	X
Chevron Ethanol	CR-10	CR10	6/7/02	X	X			X	X
Chevron Ethanol	CR12	CR12	10/24/01						X
Chevron Ethanol	CR12	CR12	4/5/01	X	X			X	X
Chevron Ethanol	CR12	CR12	8/1/01						X
Chevron Ethanol	CR-12	CR12	10/24/01	X	X			X	
Chevron Ethanol	CR-12	CR12	2/19/02	X	X			X	X
Chevron Ethanol	CR-12	CR12	6/7/02	X	X			X	X
Chevron Ethanol	CR12 (Kiff)	CR12	8/1/01	X	X				
Chevron Ethanol	CR13	CR13	4/5/01	X	X			X	X
Chevron Ethanol	CR13	CR13	6/13/01						X
Chevron Ethanol	CR-13	CR13	10/24/01	X	X			X	X
Chevron Ethanol	CR-13	CR13	2/19/02	X	X			X	X
Chevron Ethanol	CR-13	CR13	6/7/02	X	X			X	X
Chevron Ethanol	CR13 (Kiff)	CR13	8/1/01	X					
Chevron Ethanol	CR14	CR14	4/5/01	X	X			X	X
Chevron Ethanol	CR14	CR14	6/13/01						X
Chevron Ethanol	CR-14	CR14	10/24/01	X	X			X	X
Chevron Ethanol	CR-14	CR14	2/18/02	X	X			X	X
Chevron Ethanol	CR-14	CR14	6/7/02	X	X			X	X
Chevron Ethanol	CR14 (Kiff)	CR14	8/1/01	X					
Chevron Ethanol	CR15	CR15	4/5/01	X	X			X	X
Chevron Ethanol	CR15	CR15	6/13/01						X
Chevron Ethanol	CR-15	CR15	10/24/01	X	X			X	X
Chevron Ethanol	CR-15	CR15	2/19/02	X	X			X	X

**Table A-11 - Willbridge Terminal Groundwater Data Sets**

Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
Chevron Ethanol	CR-15	CR15	6/7/02	X	X			X	X
Chevron Ethanol	CR16	CR16	10/23/01						X
Chevron Ethanol	CR16	CR16	4/5/01	X	X			X	X
Chevron Ethanol	CR-16	CR16	10/24/01	X	X			X	
Chevron Ethanol	CR-16	CR16	2/18/02	X	X			X	X
Chevron Ethanol	CR-16	CR16	6/7/02	X	X			X	X
Chevron Ethanol	CR17	CR17	4/5/01	X	X			X	X
Chevron Ethanol	CR-17	CR17	10/24/01	X	X			X	X
Chevron Ethanol	CR-17	CR17	2/18/02	X	X			X	X
Chevron Ethanol	CR-17	CR17	6/7/02	X	X			X	X
Chevron Ethanol	CR19	CR19	4/5/01	X	X			X	X
Chevron Ethanol	CR19	CR19	6/13/01						X
Chevron Ethanol	CR-19	CR19	10/24/01	X	X			X	X
Chevron Ethanol	CR-19	CR19	2/20/02	X	X			X	X
Chevron Ethanol	CR-19	CR19	6/7/02	X	X			X	X
Chevron Ethanol	CR20	CR20	4/5/01	X	X			X	X
Chevron Ethanol	CR20	CR20	6/13/01						X
Chevron Ethanol	CR-20	CR20	10/24/01	X	X			X	X
Chevron Ethanol	CR-20	CR20	2/18/02	X	X			X	X
Chevron Ethanol	CR-20	CR20	6/7/02	X	X			X	X
Chevron Ethanol	CR21A	CR21A	4/4/01	X	X			X	X
Chevron Ethanol	CR-21A	CR21A	10/23/01	X	X			X	X
Chevron Ethanol	CR-21A	CR21A	2/19/02	X	X			X	X
Chevron Ethanol	CR-21A	CR21A	6/5/02	X	X			X	X
Chevron Ethanol	CR21B	CR21B	4/4/01	X	X			X	X
Chevron Ethanol	CR-21B	CR21B	10/23/01	X	X			X	X
Chevron Ethanol	CR-21B	CR21B	2/19/02	X	X			X	X
Chevron Ethanol	CR-21B	CR21B	6/5/02	X	X			X	X
Chevron Ethanol	CR22A	CR22A	4/3/01	X	X			X	X
Chevron Ethanol	CR-22A	CR22A	10/22/01	X	X			X	X
Chevron Ethanol	CR-22A	CR22A	2/20/02	X	X			X	X
Chevron Ethanol	CR-22A	CR22A	6/5/02	X	X			X	X
Chevron Ethanol	CR22B	CR22B	4/3/01	X	X			X	X
Chevron Ethanol	CR-22B	CR22B	10/22/01	X	X			X	X
Chevron Ethanol	CR-22B	CR22B	2/20/02	X	X			X	X
Chevron Ethanol	CR-22B	CR22B	6/5/02	X	X			X	X
Chevron Ethanol	CR23A	CR23A	4/4/01	X	X			X	X
Chevron Ethanol	CR-23A	CR23A	10/23/01	X				X	X
Chevron Ethanol	CR-23A	CR23A	2/20/02	X				X	X
Chevron Ethanol	CR-23A	CR23A	6/5/02	X				X	X
Chevron Ethanol	CR23-A	CR23A	10/23/01		X				
Chevron Ethanol	CR23-A	CR23A	2/20/02		X				
Chevron Ethanol	CR23-A	CR23A	6/5/02		X				
Chevron Ethanol	CR23B	CR23B	4/3/01	X	X			X	X
Chevron Ethanol	CR-23B	CR23B	10/23/01	X	X			X	X
Chevron Ethanol	CR-23B	CR23B	2/20/02	X	X			X	X
Chevron Ethanol	CR-23B	CR23B	6/5/02	X	X			X	X

Table A-11 - Willbridge Terminal Groundwater Data Sets

Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
Chevron Ethanol	CR24A	CR24A	4/5/01	X	X			X	X
Chevron Ethanol	CR-24A	CR24A	10/24/01	X	X			X	X
Chevron Ethanol	CR-24A	CR24A	2/20/02	X	X			X	X
Chevron Ethanol	CR-24A	CR24A	6/5/02	X	X			X	X
Chevron Ethanol	CR24B	CR24B	4/3/01	X	X			X	X
Chevron Ethanol	CR-24B	CR24B	10/23/01	X	X			X	X
Chevron Ethanol	CR-24B	CR24B	2/20/02	X	X			X	X
Chevron Ethanol	CR-24B	CR24B	6/5/02	X	X			X	X
Chevron Ethanol	CR25	CR25	4/5/01	X	X			X	X
Chevron Ethanol	CR-25	CR25	10/23/01	X	X			X	X
Chevron Ethanol	CR-25	CR25	2/19/02	X	X			X	X
Chevron Ethanol	CR-25	CR25	6/5/02	X	X			X	X
Chevron Ethanol	CR4	CR4	7/17/01						X
Chevron Ethanol	CR6	CR6	4/3/01	X	X			X	X
Chevron Ethanol	CR-6	CR6	10/23/01	X	X			X	X
Chevron Ethanol	CR-6	CR6	2/20/02	X	X			X	X
Chevron Ethanol	CR-6	CR6	6/5/02	X	X			X	X
Chevron Ethanol	CR7	CR7	4/4/01	X	X			X	X
Chevron Ethanol	CR7	CR7	6/13/01						X
Chevron Ethanol	CR-7	CR7	10/23/01	X	X			X	X
Chevron Ethanol	CR-7	CR7	2/20/02	X	X			X	X
Chevron Ethanol	CR-7	CR7	6/5/02	X	X			X	X
Chevron Ethanol	GPW-1	GPW1	10/22/01	X	X			X	
Chevron Ethanol	GPW-1	GPW1	10/23/01						X
Chevron Ethanol	GPW-1	GPW1	2/18/02	X					
Chevron Ethanol	GPW-1	GPW1	2/19/02		X			X	X
Chevron Ethanol	GPW-1	GPW1	4/4/01	X	X			X	X
Chevron Ethanol	GPW-1	GPW1	6/5/02	X	X			X	X
Chevron Ethanol	GPW-3	GPW3	10/23/01	X	X			X	X
Chevron Ethanol	GPW-3	GPW3	2/19/02	X	X			X	X
Chevron Ethanol	GPW-3	GPW3	4/4/01	X	X			X	X
Chevron Ethanol	GPW-3	GPW3	6/5/02	X	X			X	X
Chevron Ethanol	P1G0500-01 (Kiff	CR23B	7/16/01	X	X			X	X
Chevron Ethanol	P1G0500-02 (Kiff	CR24B	7/16/01	X	X			X	X
Chevron Ethanol	P1G0500-03 (Kiff	CR22A	7/16/01	X	X			X	X
Chevron Ethanol	P1G0500-04 (Kiff	CR22B	7/16/01	X	X			X	X
Chevron Ethanol	P1G0500-05 (Kiff	CR23A	7/16/01	X	X			X	X
Chevron Ethanol	P1G0500-06 (Kiff	GPW1	7/16/01	X	X			X	X
Chevron Ethanol	P1G0500-07 (Kiff	GPW3	7/16/01	X	X			X	X
Chevron Ethanol	P1G0500-08 (Kiff	CR21B	7/16/01	X	X			X	X
Chevron Ethanol	P1G0550-01 (Kiff	CR6	7/17/01	X	X			X	X
Chevron Ethanol	P1G0550-02 (Kiff	CR8	7/17/01	X	X			X	X
Chevron Ethanol	P1G0550-03 (Kiff	CR7	7/17/01	X	X			X	X
Chevron Ethanol	P1G0550-04 (Kiff	CR16	7/17/01	X	X			X	X
Chevron Ethanol	P1G0550-05 (Kiff	CR21A	7/17/01	X	X			X	X
Chevron Ethanol	P1G0550-08 (Kiff	CR25	7/17/01	X	X			X	X
Chevron Ethanol	P1G0550-09 (Kiff	CR17	7/17/01	X	X			X	X



Table A-11 - Willbridge Terminal Groundwater Data Sets

Sheet 10 of 15

Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
Chevron Ethanol	P1G0550-10 (Kiff	CR24A	7/17/01	X	X			X	X
Chevron Ethanol	P1G0598-01 (Kiff	CR14	7/18/01	X	X			X	X
Chevron Ethanol	P1G0598-02 (Kiff	CR20	7/18/01	X	X			X	X
Chevron Ethanol	P1G0598-03 (Kiff	CR15	7/18/01	X	X			X	X
Chevron Ethanol	P1G0598-04 (Kiff	CR13	7/18/01	X	X			X	X
Chevron Ethanol	P1G0598-05 (Kiff	CR10	7/18/01	X	X			X	X
Chevron Ethanol	P1G0598-06 (Kiff	CR19	7/18/01	X	X			X	X
Chevron Ethanol	CR-8	CR8	11/24/98	X	X	X			
Chevron Ethanol	CR-8	CR8	11/30/00	X	X	X			
Chevron Ethanol	CR-8	CR8	2/18/00	X	X	X			
Chevron Ethanol	CR-8	CR8	2/22/01	X	X	X			
Chevron Ethanol	CR-8	CR8	5/16/01	X	X	X			
Chevron Ethanol	CR-8	CR8	5/23/00	X		X			
Chevron Ethanol	CR-8	CR8	8/25/00	X	X	X			
<b>Conoco Phillips Data Set</b>									
Conoco Phillips	B-17	B-17	10/24/97	X	X	X	X		
Conoco Phillips	B-17	B-17	11/29/00	X	X	X			
Conoco Phillips	B-17	B-17	2/17/00	X	X	X			
Conoco Phillips	B-17	B-17	2/23/01	X	X	X			
Conoco Phillips	B-17	B-17	5/17/01	X	X	X			
Conoco Phillips	B-17	B-17	5/26/00	X	X	X			
Conoco Phillips	B-17	B-17	8/28/00	X	X	X			
Conoco Phillips	B-18	B-18	10/24/97	X	X	X			
Conoco Phillips	B-18	B-18	11/19/98	X	X	X	X		
Conoco Phillips	B-18	B-18	11/29/00	X	X	X			
Conoco Phillips	B-18	B-18	2/17/00	X	X	X			
Conoco Phillips	B-18	B-18	2/23/01	X	X	X			
Conoco Phillips	B-18	B-18	5/17/01	X	X	X			
Conoco Phillips	B-18	B-18	5/26/00			X			
Conoco Phillips	B-18	B-18	8/28/00	X	X	X			
Conoco Phillips	B-22	B-22	11/19/98	X	X	X	X		
Conoco Phillips	B-22	B-22	11/29/00			X			
Conoco Phillips	B-22	B-22	2/17/00			X			
Conoco Phillips	B-22	B-22	2/20/01			X			
Conoco Phillips	B-22	B-22	5/17/01			X			
Conoco Phillips	B-22	B-22	5/26/00	X	X	X			
Conoco Phillips	B-22	B-22	8/28/00			X			
Conoco Phillips	B-35	B-35	10/24/97	X	X	X			
Conoco Phillips	B-35	B-35	11/20/98	X	X	X			
Conoco Phillips	B-35	B-35	11/29/00	X	X	X			
Conoco Phillips	B-35	B-35	2/17/00	X	X	X			
Conoco Phillips	B-35	B-35	2/23/01	X	X	X			
Conoco Phillips	B-35	B-35	3/14/02	X	X	X			
Conoco Phillips	B-35	B-35	3/18/03	X	X	X			
Conoco Phillips	B-35	B-35	5/17/01	X	X	X			
Conoco Phillips	B-35	B-35	5/26/00	X	X	X			

Table A-11 - Willbridge Terminal Groundwater Data Sets

Sheet 11 of 15

Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
Conoco Phillips	B-35	B-35	8/28/00	X	X	X			
Conoco Phillips	B-35	B-35	9/20/01	X	X	X			
Conoco Phillips	B-35	B-35	9/26/02	X	X	X			
Conoco Phillips	B-36	B-36	10/24/97	X	X	X			
Conoco Phillips	B-36	B-36	11/18/98	X	X	X			
Conoco Phillips	B-36	B-36	11/29/00	X	X	X			
Conoco Phillips	B-36	B-36	2/17/00	X	X	X			
Conoco Phillips	B-36	B-36	2/23/01	X	X	X			
Conoco Phillips	B-36	B-36	3/14/02	X	X	X			
Conoco Phillips	B-36	B-36	3/18/03	X	X	X			
Conoco Phillips	B-36	B-36	5/17/01	X	X	X			
Conoco Phillips	B-36	B-36	5/26/00		X	X			
Conoco Phillips	B-36	B-36	8/28/00	X	X	X			
Conoco Phillips	B-36	B-36	9/20/01	X	X	X			
Conoco Phillips	B-36	B-36	9/26/02	X	X	X			
Conoco Phillips	B-37	B-37	10/24/97	X	X	X	X		
Conoco Phillips	B-37	B-37	11/19/98	X	X	X	X		
Conoco Phillips	B-37	B-37	11/29/00	X	X	X			
Conoco Phillips	B-37	B-37	2/17/00	X	X	X			
Conoco Phillips	B-37	B-37	2/23/01	X	X	X			
Conoco Phillips	B-37	B-37	3/14/02	X	X	X			
Conoco Phillips	B-37	B-37	3/18/03	X	X	X			
Conoco Phillips	B-37	B-37	5/17/01	X	X	X			
Conoco Phillips	B-37	B-37	5/26/00			X			
Conoco Phillips	B-37	B-37	8/28/00	X	X	X			
Conoco Phillips	B-37	B-37	9/26/02	X	X	X			
Conoco Phillips	B-4	B-4	11/29/00	X	X	X			
Conoco Phillips	B-4	B-4	2/17/00						
Conoco Phillips	B-4	B-4	2/20/01			X			
Conoco Phillips	B-4	B-4	3/13/02						
Conoco Phillips	B-4	B-4	3/17/03						
Conoco Phillips	B-4	B-4	5/17/01			X			
Conoco Phillips	B-4	B-4	5/26/00	X	X	X			
Conoco Phillips	B-4	B-4	8/23/00						
Conoco Phillips	B-4	B-4	8/28/00			X			
Conoco Phillips	B-4	B-4	9/18/01						
Conoco Phillips	B-4	B-4	9/26/02	X	X	X			
Conoco Phillips	B-40	B-40	10/24/97	X	X	X			
Conoco Phillips	B-40	B-40	11/29/00			X			
Conoco Phillips	B-40	B-40	2/17/00			X			
Conoco Phillips	B-40	B-40	2/20/01			X			
Conoco Phillips	B-40	B-40	5/17/01			X			
Conoco Phillips	B-40	B-40	5/26/00			X			
Conoco Phillips	B-40	B-40	8/28/00			X			
Conoco Phillips	U-10	U-10	3/18/03	X	X	X			
Conoco Phillips	U-11	U-11	3/18/03	X	X	X			
Conoco Phillips	U-12	U-12	3/18/03	X	X	X			

Table A-11 - Willbridge Terminal Groundwater Data Sets

Sheet 12 of 15

Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
Conoco Phillips	U-2	U-2	10/23/97	X	X	X			
Conoco Phillips	U-2	U-2	11/16/98	X	X	X			
Conoco Phillips	U-2	U-2	11/29/00	X	X	X			
Conoco Phillips	U-2	U-2	2/17/00	X	X	X			
Conoco Phillips	U-2	U-2	2/23/01	X	X	X			
Conoco Phillips	U-2	U-2	3/14/02	X	X	X			
Conoco Phillips	U-2	U-2	3/18/03	X	X	X			
Conoco Phillips	U-2	U-2	5/17/01	X	X	X			
Conoco Phillips	U-2	U-2	5/26/00	X	X	X			
Conoco Phillips	U-2	U-2	8/28/00	X	X	X			
Conoco Phillips	U-2	U-2	9/20/01	X	X	X			
Conoco Phillips	U-2	U-2	9/26/02	X	X	X			
Conoco Phillips	U-3	U-3	10/24/97	X	X	X			
Conoco Phillips	U-3	U-3	11/16/98	X	X	X	X		
Conoco Phillips	U-3	U-3	11/29/00	X	X	X			
Conoco Phillips	U-3	U-3	2/17/00	X	X	X			
Conoco Phillips	U-3	U-3	2/23/01	X	X	X			
Conoco Phillips	U-3	U-3	5/17/01	X	X	X			
Conoco Phillips	U-3	U-3	5/26/00	X	X	X			
Conoco Phillips	U-3	U-3	8/28/00	X	X	X			
Conoco Phillips	U-4	U-4	11/19/98	X	X	X			
Conoco Phillips	U-4	U-4	11/29/00	X	X	X			
Conoco Phillips	U-4	U-4	2/16/00	X					
Conoco Phillips	U-4	U-4	2/23/01	X	X	X			
Conoco Phillips	U-4	U-4	3/13/02						
Conoco Phillips	U-4	U-4	3/17/03						
Conoco Phillips	U-4	U-4	5/17/01			X			
Conoco Phillips	U-4	U-4	5/26/00	X	X	X			
Conoco Phillips	U-4	U-4	8/28/00	X	X	X			
Conoco Phillips	U-4	U-4	9/18/01						
Conoco Phillips	U-4	U-4	9/26/02	X	X	X			
Conoco Phillips	U-5	U-5	10/24/97	X	X	X			
Conoco Phillips	U-5	U-5	11/19/98	X	X	X	X		
Conoco Phillips	U-5	U-5	11/29/00	X	X	X			
Conoco Phillips	U-5	U-5	2/17/00	X	X	X			
Conoco Phillips	U-5	U-5	2/23/01	X	X	X			
Conoco Phillips	U-5	U-5	3/18/03	X	X	X			
Conoco Phillips	U-5	U-5	5/17/01			X			
Conoco Phillips	U-5	U-5	5/26/00	X	X	X			
Conoco Phillips	U-5	U-5	8/28/00	X	X	X			
Conoco Phillips	U-5	U-5	9/18/01						
Conoco Phillips	U-5	U-5	9/26/02						
Conoco Phillips	B-16	B-16	10/27/97	X	X	X			
Conoco Phillips	B-2	B-2	10/27/97	X	X	X	X		
Conoco Phillips	B-25	B-25	11/19/98	X	X	X	X		
Conoco Phillips	B-41	B-41	10/24/97	X	X	X			
Conoco Phillips	B-6	B-6	10/27/97	X	X	X	X		

Table A-11 - Willbridge Terminal Groundwater Data Sets

Sheet 13 of 15

Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
Conoco Phillips	B-6	B-6	11/18/98	X	X	X			
Conoco Phillips	B-6 (RR)	B-6 (RR)	11/18/98	X	X				
Conoco Phillips	P-1	P-1	11/20/98	X	X	X			
Conoco Phillips	P-1	P-1	3/17/03		X	X			
Conoco Phillips	P-1	P-1	3/18/03	X					
Conoco Phillips	P-2	P-2	3/17/03	X	X	X			
Conoco Phillips	RES-N	RES-N	11/10/97		X				
<b>Utility Corridor Data Set</b>									
Kinder Morgan	MW-20	MW-20	10/28/97		X	X	X	X	
Kinder Morgan	MW-25	MW-25	3/14/02		X	X	X		
Kinder Morgan	MW-25	MW-25	3/18/03		X	X	X		
Kinder Morgan	MW-25	MW-25	9/21/01		X	X	X		
Kinder Morgan	MW-25	MW-25	9/27/02		X	X	X		
Kinder Morgan	MW-26	MW-26	12/8/98		X	X	X		
Kinder Morgan	MW-26	MW-26	12/1/00		X	X	X		
Kinder Morgan	MW-26	MW-26	2/17/00		X	X	X		
Kinder Morgan	MW-26	MW-26	2/21/01				X		
Kinder Morgan	MW-26	MW-26	3/13/02						
Kinder Morgan	MW-26	MW-26	3/18/03		X	X	X		
Kinder Morgan	MW-26	MW-26	5/17/01		X	X	X		
Kinder Morgan	MW-26	MW-26	5/30/00		X	X	X		
Kinder Morgan	MW-26	MW-26	8/23/00		X	X	X		
Kinder Morgan	MW-26	MW-26	9/18/01						
Kinder Morgan	MW-26	MW-26	9/27/02		X	X	X		
Kinder Morgan	MW-28	MW-28	11/30/00				X		
Kinder Morgan	MW-28	MW-28	12/1/00						
Kinder Morgan	MW-28	MW-28	2/16/00		X	X	X		
Kinder Morgan	MW-28	MW-28	2/21/01				X		
Kinder Morgan	MW-28	MW-28	5/16/01				X		
Kinder Morgan	MW-28	MW-28	5/30/00				X		
Kinder Morgan	MW-28	MW-28	8/23/00				X		
Kinder Morgan	MW-28	MW-28	8/24/00						
Kinder Morgan	MW-29	MW-29	10/29/97		X	X	X		
Kinder Morgan	MW-39	MW-39	12/10/98		X	X	X	X	
Kinder Morgan	MW-9	MW-9	10/27/97		X		X		
Kinder Morgan	MW-9	MW-9	10/27/98			X			
Chevron	B-11	B-11	10/21/97		X	X	X		
Chevron	B-11	B-11	11/23/98		X	X	X		
Chevron	B-28	B-28	10/23/97		X	X	X		
Chevron	B-28	B-28	11/24/98		X	X	X		
Chevron	B-28	B-28	3/20/03		X	X	X		
Chevron	B-29	B-29	10/22/97		X	X	X		
Chevron	B-29	B-29	3/20/03		X	X	X		
Chevron	B-30	B-30	10/23/97		X	X	X	X	
Chevron	B-30	B-30	11/24/98		X	X	X	X	
Chevron	B-30	B-30	3/20/03		X	X	X		

Table A-11 - Willbridge Terminal Groundwater Data Sets

Sheet 14 of 15

Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
Chevron	B-24	B-24	10/23/97		X	X	X	X	
Chevron	B-24	B-24	11/23/98		X	X			
Chevron	B-11	B-11	11/30/00		X	X	X		
Chevron	B-11	B-11	2/18/00		X	X	X		
Chevron	B-11	B-11	2/22/01		X	X	X		
Chevron	B-11	B-11	5/17/01		X	X	X		
Chevron	B-11	B-11	5/23/00		X	X	X		
Chevron	B-11	B-11	8/25/00		X	X	X		
Chevron	B-28	B-28	11/30/00		X	X	X		
Chevron	B-28	B-28	2/18/00		X	X	X		
Chevron	B-28	B-28	2/23/01		X	X	X		
Chevron	B-28	B-28	3/21/02		X	X	X		
Chevron	B-28	B-28	5/17/01		X	X	X		
Chevron	B-28	B-28	5/23/00				X		
Chevron	B-28	B-28	8/25/00		X	X	X		
Chevron	B-28	B-28	9/20/01		X	X	X		
Chevron	B-28	B-28	9/24/02		X	X	X		
Chevron	B-29	B-29	3/21/02		X	X	X		
Chevron	B-29	B-29	9/20/01		X	X	X		
Chevron	B-29	B-29	9/24/02		X	X	X		
Chevron	B-30	B-30	11/30/00		X	X	X		
Chevron	B-30	B-30	2/18/00		X	X	X		
Chevron	B-30	B-30	2/23/01		X	X	X		
Chevron	B-30	B-30	3/21/02		X	X	X		
Chevron	B-30	B-30	5/17/01		X	X	X		
Chevron	B-30	B-30	5/23/00		X	X	X		
Chevron	B-30	B-30	8/25/00		X	X	X		
Chevron	B-30	B-30	9/20/01		X	X	X		
Chevron	B-30	B-30	9/24/02		X	X	X		
Conoco Phillips	B-4	B-4	11/29/00		X	X	X		
Conoco Phillips	B-4	B-4	2/17/00						
Conoco Phillips	B-4	B-4	2/20/01				X		
Conoco Phillips	B-4	B-4	3/13/02						
Conoco Phillips	B-4	B-4	3/17/03						
Conoco Phillips	B-4	B-4	5/17/01				X		
Conoco Phillips	B-4	B-4	5/26/00		X	X	X		
Conoco Phillips	B-4	B-4	8/23/00						
Conoco Phillips	B-4	B-4	8/28/00				X		
Conoco Phillips	B-4	B-4	9/18/01						
Conoco Phillips	B-4	B-4	9/26/02		X	X	X		
Conoco Phillips	U-2	U-2	10/23/97		X	X	X		
Conoco Phillips	U-2	U-2	11/16/98		X	X	X		
Conoco Phillips	U-2	U-2	11/29/00		X	X	X		
Conoco Phillips	U-2	U-2	2/17/00		X	X	X		
Conoco Phillips	U-2	U-2	2/23/01		X	X	X		
Conoco Phillips	U-2	U-2	3/14/02		X	X	X		
Conoco Phillips	U-2	U-2	3/18/03		X	X	X		

**Table A-11 - Willbridge Terminal Groundwater Data Sets**

Area	Sample ID	Location	Sampling Date	SVOCs	VOCs	Total Metals	Diss. Metals	TPH	Conv.
Conoco Phillips	U-2	U-2	5/17/01		X	X	X		
Conoco Phillips	U-2	U-2	5/26/00		X	X	X		
Conoco Phillips	U-2	U-2	8/28/00		X	X	X		
Conoco Phillips	U-2	U-2	9/20/01		X	X	X		
Conoco Phillips	U-2	U-2	9/26/02		X	X	X		
Conoco Phillips	B-6	B-6	10/27/97		X	X	X	X	
Conoco Phillips	B-6	B-6	11/18/98		X	X	X		
Conoco Phillips	B-6 (RR)	B-6 (RR)	11/18/98		X	X			
<b>Chevron Asphalt Data Set</b>									
Chevron Asphalt	A-1	A-1	11/3/97	X	X	X			
Chevron Asphalt	A-5	A-5	11/3/97	X	X	X			
Chevron Asphalt	W-10	W-10	11/3/97	X	X	X			
Chevron Asphalt	W-15	W-15	11/3/97	X	X	X			
Chevron Asphalt	W-6	W-6	11/3/97	X	X	X			

**ATTACHMENT B**  
**HUMAN HEALTH RISK ASSESSMENT TABLES**

**Table B-1 - KMLT Site Worker Risk Calculations**  
**Soil Ingestion (Surface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds												
1,2,4-Trimethylbenzene	7.1E-01	1.8E-01	6.95E-07	2.23E-08	5.0E-02	1.E-05	4.E-07	2.5E-07	1.9E-09	--	--	--
1,3,5-Trimethylbenzene	5.8E-01	1.6E-01	5.68E-07	1.91E-08	5.0E-02	1.E-05	4.E-07	2.0E-07	1.6E-09	--	--	--
Ethylbenzene	1.6E+00	6.3E-01	1.53E-06	7.75E-08	1.0E-01	2.E-05	8.E-07	5.5E-07	6.6E-09	--	--	--
Xylenes (total)	1.7E+00	7.2E-01	1.70E-06	8.81E-08	2.0E-01	9.E-06	4.E-07	6.1E-07	7.5E-09	--	--	--
Semivolatile Organic Compounds												
Benzo(a)anthracene	2.9E+00	9.5E-01	2.88E-06	1.16E-07	--	--	--	1.0E-06	1.0E-08	7.3E-01	8.E-07	7.E-09
Benzo(a)pyrene	2.4E+00	6.8E-01	2.37E-06	8.32E-08	--	--	--	8.5E-07	7.1E-09	7.3E+00	6.E-06	5.E-08
Chrysene	3.9E+00	1.2E+00	3.82E-06	1.52E-07	--	--	--	1.4E-06	1.3E-08	7.3E-03	1.E-08	9.E-11
Naphthalene	2.5E+00	1.0E+00	2.46E-06	1.27E-07	2.0E-02	1.E-04	6.E-06	8.8E-07	1.1E-08	--	--	--
Metals												
Arsenic	1.1E+01	5.8E+00	1.03E-05	7.07E-07	3.0E-04	3.E-02	2.E-03	3.7E-06	6.1E-08	1.5E+00	6.E-06	9.E-08
			TOTAL HAZARD INDEX			3.E-02	2.E-03	TOTAL CANCER RISK			1.E-05	2.E-07

F:\Data\Jobs\15302 - Willbridge Terminal Group - Risk Assessment Revision\2 - Risk Assessment Report\02 - Attachments\Attachment B (B-1 KM Site Worker)

**Notes:**

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration



**Table B-1 - KMLT Site Worker Risk Calculations**  
**Dermal Contact with Soil (Surface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	ABS	Soil EPC in mg/kg		Hazard Intake in mg/kg-day		RfD In mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds													
1,2,4-Trimethylbenzene	--	7.1E-01	1.8E-01	--	--	5.0E-02	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	--	5.8E-01	1.6E-01	--	--	5.0E-02	--	--	--	--	--	--	--
Ethylbenzene	--	1.6E+00	6.3E-01	--	--	1.0E-01	--	--	--	--	--	--	--
Xylenes (total)	--	1.7E+00	7.2E-01	--	--	2.0E-01	--	--	--	--	--	--	--
Semivolatile Organic Compounds													
Benzo(a)anthracene	0.13	2.9E+00	9.5E-01	1.2E-06	2.0E-08	--	--	--	4.4E-07	1.7E-09	7.3E-01	3.2E-07	1.2E-09
Benzo(a)pyrene	0.13	2.4E+00	6.8E-01	1.0E-06	1.4E-08	--	--	--	3.6E-07	1.2E-09	7.3E+00	2.6E-06	8.9E-09
Chrysene	0.13	3.9E+00	1.2E+00	1.6E-06	2.6E-08	--	--	--	5.9E-07	2.2E-09	7.3E-03	4.3E-09	1.6E-11
Naphthalene	0.1	2.5E+00	1.0E+00	8.1E-07	1.7E-08	2.0E-02	4.1E-05	8.4E-07	2.9E-07	1.4E-09	--	--	--
Metals													
Arsenic	0.03	1.1E+01	5.8E+00	1.0E-06	2.8E-08	3.0E-04	3.4E-03	9.3E-05	3.6E-07	2.4E-09	1.5E+00	5.4E-07	3.6E-09
				TOTAL HAZARD INDEX			3.E-03	9.E-05	TOTAL CANCER RISK			4.E-06	1.E-08

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**Notes:**

ABS = Dermal Absorption Fraction (EPA, 2001)

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

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**Table B-1 - KMLT Site Worker Risk Calculations**  
**Indoor Air, Inhalation of Volatiles from Soil (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil Concentration in mg/kg		Hazard RBC in mg/kg		Hazard Quotient		Cancer RBC in mg/kg		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
1,2,4-Trimethylbenzene	7.1E-01	1.6E-01	8.4E+02	8.4E+02	8.E-04	2.E-04	--	--	--	--
1,3,5-Trimethylbenzene	5.8E-01	1.4E-01	1.4E+02	1.4E+02	4.E-03	1.E-03	--	--	--	--
Ethylbenzene	7.9E+00	3.4E-01	1.1E+04	1.1E+04	7.E-04	3.E-05	--	--	--	--
Xylenes (total)	6.3E+00	3.8E-01	1.3E+03	1.3E+03	5.E-03	3.E-04	--	--	--	--
<b>Semivolatile Organic Compounds</b>										
Naphthalene	1.4E+00	6.5E-01	3.4E+06	3.4E+06	4.E-07	2.E-07	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>1.E-02</b>	<b>2.E-03</b>	<b>TOTAL CANCER RISK</b>		<b>0.E+00</b>	<b>0.E+00</b>

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**Notes:**

Indoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-1 - KMLT Site Worker Risk Calculations**  
**Indoor Air, Inhalation of Volatiles from Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
1,2,4-Trimethylbenzene	1.36E+03	1.37E+02	5.1E+04	5.1E+04	3.E-02	3.E-03	--	--	--	--
1,3,5-Trimethylbenzene	1.32E+02	3.37E+01	3.8E+04	3.8E+04	3.E-03	9.E-04	--	--	--	--
Benzene	5.53E+02	3.01E+02	2.3E+05	2.3E+05	2.E-03	1.E-03	2.5E+03	1.1E+04	2.E-07	3.E-08
Chloroform	6.79E+00	6.33E+00	2.8E+04	2.8E+04	2.E-04	2.E-04	--	--	--	--
Ethylbenzene	5.55E+02	3.01E+02	6.4E+06	6.4E+06	9.E-05	5.E-05	--	--	--	--
Toluene	2.86E+02	1.53E+02	2.5E+06	2.5E+06	1.E-04	6.E-05	--	--	--	--
Xylenes (total)	1.59E+03	8.69E+02	7.1E+05	7.1E+05	2.E-03	1.E-03	--	--	--	--
<b>Semivolatile Organic Compounds</b>										
Naphthalene	7.4E+01	4.0E+01	3.5E+05	3.5E+05	2.E-04	1.E-04	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>4.E-02</b>	<b>7.E-03</b>	<b>TOTAL CANCER RISK</b>		<b>2.E-07</b>	<b>3.E-08</b>

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**Notes:**

Indoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-1 - KMLT Site Worker Risk Calculations**  
**Inhalation of Particulates (Surface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		PEF in m³/kg	Air EPC (1) in mg/3		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds															
1,2,4-Trimethylbenzene	7.1E-01	1.8E-01	1.32E+09	5.4E-10	1.4E-10	3.7E-11	2.4E-12	1.7E-03	2.2E-08	1.4E-09	1.3E-11	2.0E-13	--	--	--
1,3,5-Trimethylbenzene	5.8E-01	1.6E-01	1.32E+09	4.4E-10	1.2E-10	3.0E-11	2.0E-12	1.7E-03	1.8E-08	1.2E-09	1.1E-11	1.7E-13	--	--	--
Ethylbenzene	1.6E+00	6.3E-01	1.32E+09	1.2E-09	4.8E-10	8.1E-11	8.2E-12	2.9E-01	2.8E-10	2.8E-11	2.9E-11	7.0E-13	--	--	--
Xylenes (total)	1.7E+00	7.2E-01	1.32E+09	1.3E-09	5.5E-10	9.0E-11	9.3E-12	2.9E-02	3.1E-09	3.2E-10	3.2E-11	8.0E-13	--	--	--
Semivolatlve Organic Compounds															
Benzo(a)anthracene	2.9E+00	9.5E-01	1.32E+09	2.2E-09	7.2E-10	1.5E-10	1.2E-11	--	--	--	5.5E-11	1.1E-12	7.3E-01	4.0E-11	7.7E-13
Benzo(a)pyrene	2.4E+00	6.8E-01	1.32E+09	1.8E-09	5.2E-10	1.3E-10	8.8E-12	--	--	--	4.5E-11	7.6E-13	7.3E+00	3.3E-10	5.5E-12
Chrysene	3.9E+00	1.2E+00	1.32E+09	3.0E-09	9.4E-10	2.0E-10	1.6E-11	--	--	--	7.2E-11	1.4E-12	7.3E-03	5.3E-13	1.0E-14
Naphthalene	2.5E+00	1.0E+00	1.32E+09	1.9E-09	7.9E-10	1.3E-10	1.3E-11	8.6E-04	1.5E-07	1.6E-08	4.7E-11	1.2E-12	--	--	--
Metals															
Arsenic	1.1E+01	5.8E+00	1.32E+09	8.0E-09	4.4E-09	5.4E-10	7.5E-11	--	--	--	1.9E-10	6.4E-12	1.5E+01	2.9E-09	9.6E-11
TOTAL HAZARD INDEX						2.E-07	2.E-08	TOTAL CANCER RISK						3.E-09	1.E-10

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**Notes:**

(1) Air EPC calculated using PEF = 1.32E-09 m<sup>3</sup>/kg (Air EPC = Soil EPC/PEF)

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

PEF = Particulate Emission Factor

RfD = Reference Dose

CSF = Cancer Slope Factor

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**Table B-1 - KMLT Site Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Soil (Surface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		VF in m <sup>3</sup> /kg	Air EPC (1) in mg/3		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF In (mg/kg-day) <sup>-1</sup>	Cancer Risk	
	RME	CT		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds															
1,2,4-Trimethylbenzene	7.1E-01	1.8E-01	2.0E+04	3.6E-05	9.1E-06	2.4E-06	1.6E-07	1.7E-03	1.4E-03	9.2E-05	8.7E-07	1.3E-08	--	--	--
1,3,5-Trimethylbenzene	5.8E-01	1.6E-01	8.0E+03	7.3E-05	2.0E-05	5.0E-06	3.3E-07	1.7E-03	2.9E-03	2.0E-04	1.8E-06	2.9E-08	--	--	--
Ethylbenzene	1.6E+00	6.3E-01	5.4E+03	2.9E-04	1.2E-04	2.0E-05	2.0E-06	2.9E-01	6.8E-05	6.9E-06	7.1E-06	1.7E-07	--	--	--
Xylenes (total)	1.7E+00	7.2E-01	6.1E+03	2.9E-04	1.2E-04	2.0E-05	2.0E-06	2.9E-02	6.7E-04	7.0E-05	7.0E-06	1.7E-07	--	--	--
Semivolatile Organic Compounds															
Naphthalene	2.5E+00	1.0E+00	4.3E+04	5.8E-05	2.4E-05	4.0E-06	4.1E-07	8.6E-04	4.6E-03	4.8E-04	1.4E-06	3.5E-08	--	--	--
TOTAL HAZARD INDEX									5.E-03	4.E-04	TOTAL CANCER RISK			0.E+00	0.E+00

**Notes:**

(1) Air EPC = Soil EPC/VF  
RME = Reasonable Maximum Exposure  
CT = Central Tendency  
EPC = Exposure Point Concentration  
VF = Volatilization Factor (EPA 2002)  
RfD = Reference Dose  
CSF = Cancer Slope Factor

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**Table B-1 - KMLT Site Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Soil (Subsurface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil Concentration in mg/kg		Hazard RBC in mg/kg		Hazard Quotient		Cancer RBC in mg/kg		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
Ethylbenzene	3.7E-01	9.0E-02	1.6E+05	1.6E+05	2.E-06	6.E-07	--	--	--	--
Xylenes (total)	8.2E-01	1.1E-01	1.6E+04	1.6E+04	5.E-05	7.E-06	--	--	--	--
<b>Semivolatile Organic Compounds</b>										
Naphthalene	9.4E-01	3.2E-01	9.4E+02	9.4E+02	1.E-03	3.E-04	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>1.E-03</b>	<b>3.E-04</b>	<b>TOTAL CANCER RISK</b>		<b>0.E+00</b>	<b>0.E+00</b>

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**Notes:**

Outdoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-1 - KMLT Site Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
1,2,4-Trimethylbenzene	1.4E+03	1.4E+02	2.6E+05	2.6E+05	5.E-03	5.E-04	--	--	--	--
1,3,5-Trimethylbenzene	1.3E+02	3.4E+01	2.1E+05	2.1E+05	6.E-04	2.E-04	--	--	--	--
Benzene	5.5E+02	3.0E+02	1.1E+06	1.1E+06	5.E-04	3.E-04	1.2E+04	5.1E+04	5.E-08	6.E-09
Chloroform	6.8E+00	6.3E+00	1.3E+05	1.3E+05	5.E-05	5.E-05	--	--	--	--
Ethylbenzene	5.6E+02	3.0E+02	3.5E+07	3.5E+07	2.E-05	9.E-06	--	--	--	--
Toluene	2.9E+02	1.5E+02	1.3E+07	1.3E+07	2.E-05	1.E-05	--	--	--	--
Xylenes (total)	1.6E+03	8.7E+02	3.7E+06	3.7E+06	4.E-04	2.E-04	--	--	--	--
<b>Semivolatile Organic Compounds</b>										
Naphthalene	7.4E+01	4.0E+01	5.1E+05	5.1E+05	1.E-04	8.E-05	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>7.E-03</b>	<b>1.E-03</b>	<b>TOTAL CANCER RISK</b>		<b>5.E-08</b>	<b>6.E-09</b>

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**Notes:**

Outdoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-2 - KMLT Trench Worker Risk Calculations**  
**Soil Ingestion (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds												
1,2,4-Trimethylbenzene	7.1E-01	1.6E-01	8.25E-08	1.41E-09	5.0E-02	2.E-06	3.E-08	1.2E-09	2.0E-11	--	--	--
1,3,5-Trimethylbenzene	5.8E-01	1.4E-01	6.74E-08	1.22E-09	5.0E-02	1.E-06	2.E-08	9.6E-10	1.7E-11	--	--	--
Ethylbenzene	7.9E+00	3.4E-01	9.17E-07	2.95E-09	1.0E-01	9.E-06	3.E-08	1.3E-08	4.2E-11	--	--	--
Xylenes (total)	6.3E+00	3.8E-01	7.33E-07	3.38E-09	2.0E-01	4.E-06	2.E-08	1.0E-08	4.8E-11	--	--	--
Semivolatile Organic Compounds												
Benzo(a)anthracene	9.7E-01	5.3E-01	1.13E-07	4.67E-09	--	--	--	1.6E-09	6.7E-11	7.3E-01	1.E-09	5.E-11
Benzo(a)pyrene	9.2E-01	4.1E-01	1.07E-07	3.61E-09	--	--	--	1.5E-09	5.2E-11	7.3E+00	1.E-08	4.E-10
Bis(2-ethylhexyl)phthalate	3.9E+00	3.9E+00	4.48E-07	3.39E-08	2.0E-02	2.E-05	2.E-06	6.4E-09	4.8E-10	1.4E-02	9.E-11	7.E-12
Chrysene	2.0E-01	1.8E-01	2.32E-08	1.59E-09	--	--	--	3.3E-10	2.3E-11	7.3E-03	2.E-12	2.E-13
Naphthalene	1.4E+00	6.5E-01	1.64E-07	5.72E-09	2.0E-02	8.E-06	3.E-07	2.3E-09	8.2E-11	--	--	--
Metals												
Arsenic	1.3E+01	6.9E+00	1.52E-06	6.09E-08	3.0E-04	5.E-03	2.E-04	2.2E-08	8.7E-10	1.5E+00	3.E-08	1.E-09
			TOTAL HAZARD INDEX			5.E-03	2.E-04	TOTAL CANCER RISK			4.E-08	2.E-09

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**Notes:**  
RME = Reasonable Maximum Exposure  
CT = Central Tendency  
EPC = Exposure Point Concentration  
RfD = Reference Dose

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**Table B-2 - KMLT Trench Worker Risk Calculations**  
**Dermal Contact with Soil (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	ABS	Soil EPC in mg/kg		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds													
1,2,4-Trimethylbenzene	--	7.1E-01	1.6E-01	--	--	5.0E-02	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	--	5.8E-01	1.4E-01	--	--	5.0E-02	--	--	--	--	--	--	--
Ethylbenzene	--	7.9E+00	3.4E-01	--	--	1.0E-01	--	--	--	--	--	--	--
Xylenes (total)	--	6.3E+00	3.8E-01	--	--	2.0E-01	--	--	--	--	--	--	--
Semivolatlve Organic Compounds													
Benzo(a)anthracene	0.13	9.7E-01	5.3E-01	8.8E-08	4.0E-09	--	--	--	1.3E-09	5.7E-11	7.3E-01	9.2E-10	4.2E-11
Benzo(a)pyrene	0.13	9.2E-01	4.1E-01	8.3E-08	3.1E-09	--	--	--	1.2E-09	4.4E-11	7.3E+00	8.7E-09	3.2E-10
Bis(2-ethylhexyl)phthalate	0.1	3.9E+00	3.9E+00	2.7E-07	2.2E-08	2.0E-02	1.3E-05	1.1E-06	3.8E-09	3.2E-10	1.4E-02	5.4E-11	4.5E-12
Chrysene	0.13	2.0E-01	1.8E-01	1.8E-08	1.4E-09	--	--	--	2.6E-10	1.9E-11	7.3E-03	1.9E-12	1.4E-13
Naphthalene	0.13	1.4E+00	6.5E-01	1.3E-07	4.9E-09	2.0E-02	6.4E-06	2.5E-07	1.8E-09	7.0E-11	--	--	--
Metals													
Arsenic	0.03	1.3E+01	6.9E+00	2.7E-07	1.2E-08	3.0E-04	9.E-04	4.E-05	3.9E-09	1.7E-10	1.5E+00	5.9E-09	2.6E-10
				TOTAL HAZARD INDEX			9.E-04	4.E-05	TOTAL CANCER RISK			2.E-08	6.E-10

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**Notes:**

ABS = Dermal Absorption Fraction (EPA, 2001)

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

RfD = Reference Dose

**Table B-2 - KMLT Trench Worker Risk Calculations**  
**Inhalation of Particulates (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		PEF in m³/kg	Air EPC (1) in mg/3		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds															
1,2,4-Trimethylbenzene	7.1E-01	1.6E-01	1.32E+09	5.4E-10	1.2E-10	1.3E-12	7.5E-14	1.7E-03	7.8E-10	4.4E-11	1.9E-14	1.1E-15	--	--	--
1,3,5-Trimethylbenzene	5.8E-01	1.4E-01	1.32E+09	4.4E-10	1.0E-10	1.1E-12	6.4E-14	1.7E-03	6.4E-10	3.8E-11	1.5E-14	9.2E-16	--	--	--
Ethylbenzene	7.9E+00	3.4E-01	1.32E+09	6.0E-09	2.5E-10	1.5E-11	1.6E-13	2.9E-01	5.1E-11	5.4E-13	2.1E-13	2.2E-15	--	--	--
Xylenes (total)	6.3E+00	3.8E-01	1.32E+09	4.8E-09	2.9E-10	1.2E-11	1.8E-13	2.9E-02	4.1E-10	6.2E-12	1.7E-13	2.6E-15	--	--	--
Semivolatile Organic Compounds															
Benzo(a)anthracene	9.7E-01	5.3E-01	1.32E+09	7.3E-10	4.0E-10	1.8E-12	2.5E-13	--	--	--	2.6E-14	3.5E-15	7.3E-01	1.9E-14	2.6E-15
Benzo(a)pyrene	9.2E-01	4.1E-01	1.32E+09	7.0E-10	3.1E-10	1.7E-12	1.9E-13	--	--	--	2.5E-14	2.7E-15	7.3E+00	1.8E-13	2.0E-14
Bis(2-ethylhexyl)phthalate	3.9E+00	3.9E+00	1.32E+09	2.9E-09	2.9E-09	7.2E-12	1.8E-12	2.2E-02	3.3E-10	8.2E-11	1.0E-13	2.6E-14	1.4E-02	1.4E-15	3.6E-16
Chrysene	2.0E-01	1.8E-01	1.32E+09	1.5E-10	1.4E-10	3.7E-13	8.4E-14	--	--	--	5.3E-15	1.2E-15	7.3E-03	3.9E-17	8.8E-18
Naphthalene	1.4E+00	6.5E-01	1.32E+09	1.1E-09	4.9E-10	2.6E-12	3.0E-13	8.6E-04	3.1E-09	3.5E-10	3.8E-14	4.3E-15	--	--	--
Metals															
Arsenic	1.3E+01	6.9E+00	1.32E+09	9.9E-09	5.2E-09	2.4E-11	3.2E-12	--	--	--	3.5E-13	4.6E-14	1.5E+01	5.2E-12	6.9E-13
TOTAL HAZARD INDEX						5.E-09	5.E-10	TOTAL CANCER RISK						5.E-12	7.E-13

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**Notes:**

(1) Air EPC calculated using  $PEF = 1.32E-09 \text{ m}^3/\text{kg}$  (Air EPC = Soil EPC/PEF)  
RME = Reasonable Maximum Exposure  
CT = Central Tendency  
EPC = Exposure Point Concentration  
PEF = Particulate Emission Factor  
RfD = Reference Dose

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**Table B-2 - KMLT Trench Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Soil (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		VF in m³/kg	Air EPC (1) in mg/3		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds															
1,2,4-Trimethylbenzene	7.1E-01	1.6E-01	2.0E+04	3.6E-05	8.0E-06	8.8E-08	4.9E-09	1.7E-03	5.1E-05	2.9E-06	1.3E-09	7.0E-11	--	--	--
1,3,5-Trimethylbenzene	5.8E-01	1.4E-01	8.0E+03	7.3E-05	1.7E-05	1.8E-07	1.1E-08	1.7E-03	1.1E-04	6.3E-06	2.6E-09	1.5E-10	--	--	--
Ethylbenzene	7.9E+00	3.4E-01	5.4E+03	1.5E-03	6.2E-05	3.6E-06	3.8E-08	2.9E-01	1.2E-05	1.3E-07	5.1E-08	5.5E-10	--	--	--
Xylenes (total)	6.3E+00	3.8E-01	6.1E+03	1.0E-03	6.3E-05	2.6E-06	3.9E-08	2.9E-02	8.8E-05	1.3E-06	3.6E-08	5.5E-10	--	--	--
Semivolatile Organic Compounds															
Naphthalene	1.4E+00	6.5E-01	4.3E+04	3.3E-05	1.5E-05	8.1E-08	9.3E-09	8.6E-04	9.4E-05	1.1E-05	1.2E-09	1.3E-10	--	--	--
						TOTAL HAZARD INDEX			4.E-04	2.E-05	TOTAL CANCER RISK			0.E+00	0.E+00

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**Notes:**

(1) Air EPC = Soil EPC/VF

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

VF = Volatilization Factor (EPA 2002)

RfD = Reference Dose

**Table B-2 - KMLT Trench Worker Risk Calculations**  
**Inhalation of Volatiles and Dermal Contact with Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
1,2,4-Trimethylbenzene	1.4E+03	1.4E+02	1.2E+03	1.2E+03	1.1E+00	1.E-01	--	--	--	--
1,3,5-Trimethylbenzene	1.3E+02	3.4E+01	1.3E+03	1.3E+03	1.0E-01	3.E-02	--	--	--	--
Benzene	5.5E+02	3.0E+02	5.3E+03	5.3E+03	1.0E-01	6.E-02	1.5E+03	3.0E+03	4.E-07	1.E-07
Chloroform	6.8E+00	6.3E+00	6.9E+02	6.9E+02	9.8E-03	9.E-03	--	--	--	--
Ethylbenzene	5.6E+02	3.0E+02	8.1E+04	8.1E+04	6.9E-03	4.E-03	--	--	--	--
Toluene	2.9E+02	1.5E+02	7.4E+04	7.4E+04	3.9E-03	2.E-03	--	--	--	--
Xylenes (total)	1.6E+03	8.7E+02	2.1E+04	2.1E+04	7.6E-02	4.E-02	--	--	--	--
<b>Semivolatilve Organic Compounds</b>										
Bis(2-ethylhexyl)phthalate	1.6E+01	6.1E+00	8.4E+03	8.4E+03	1.9E-03	7.E-04	2.1E+03	2.1E+03	8.E-09	3.E-09
Chrysene	5.8E+02	5.1E+00	--	--	--	--	5.1E+02	1.0E+03	1.E-06	5.E-09
Naphthalene	7.4E+01	4.0E+01	6.8E+02	6.8E+02	1.1E-01	6.E-02	--	--	--	--
2-methylnaphthalene	1.1E+02	1.3E+01	6.8E+02	6.8E+02	1.6E-01	2.E-02	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>2.E+00</b>	<b>3.E-01</b>	<b>TOTAL CANCER RISK</b>		<b>2.E-06</b>	<b>1.E-07</b>

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**Notes:**

Groundwater RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-2 - KMLT Trench Worker Risk Calculations**  
**Dermal Contact with Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater EPC in µg/L		DA <sub>water</sub> in mg/cm <sup>2</sup> /event		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day) <sup>-1</sup>	Cancer Risk	
	RME	CT	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
<b>Metals</b>														
Arsenic	3.0E+01	2.3E+01	5.9E-08	4.6E-08	9.5E-09	3.7E-09	3.0E-04	3.2E-05	1.2E-05	3.4E-09	1.3E-09	1.5E+00	5.1E-09	2.0E-09
<b>TOTAL HAZARD INDEX</b>								<b>3.E-05</b>	<b>1.E-05</b>	<b>TOTAL CANCER RISK</b>			<b>5.E-09</b>	<b>2.E-09</b>

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**Notes:**

DA<sub>water</sub> = Dose absorbed per unit area per water contact event (DEQ, 2000)

RME = Reasonable Maximum Exposure.

CT = Central Tendency.

EPC = Exposure Point Concentration.

RfD = Reference Dose

CSF = Cancer Slope Factor

**Table B-3 - KMLT Landscape Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
Benzene	6.2E+03	6.2E+03	1.1E+06	1.1E+06	6.E-03	6.E-03	1.2E+04	5.1E+04	5.E-07	1.E-07
Ethylbenzene	4.9E+03	4.9E+03	3.5E+07	3.5E+07	1.E-04	1.E-04	--	--	--	--
Toluene	2.8E+03	2.8E+03	1.3E+07	1.3E+07	2.E-04	2.E-04	--	--	--	--
Xylenes (total)	1.5E+04	1.5E+04	3.7E+06	3.7E+06	4.E-03	4.E-03	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>1.E-02</b>	<b>1.E-02</b>	<b>TOTAL CANCER RISK</b>		<b>5.E-07</b>	<b>1.E-07</b>

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**Notes:**

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-4 - ChevronTexaco Site Worker Risk Calculations**  
**Soil Ingestion (Surface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds												
1,2,4-Trimethylbenzene	5.3E+00	7.0E-01	5.17E-06	8.61E-08	5.0E-02	1.E-04	2.E-06	1.8E-06	7.4E-09	--	--	--
Toluene	1.8E-01	8.0E-02	1.77E-07	9.78E-09	2.0E-01	9.E-07	5.E-08			--	--	--
Xylenes (total)	6.6E-01	2.0E-01	6.47E-07	2.46E-08	2.0E-01	3.E-06	1.E-07	2.3E-07	2.1E-09	--	--	--
Semivolatile Organic Compounds												
Benzo(a)anthracene	2.1E-01	9.8E-02	2.02E-07	1.20E-08	--	--	--	7.2E-08	1.0E-09	7.3E-01	5.E-08	8.E-10
Benzo(a)pyrene	2.0E-01	1.4E-01	1.91E-07	1.68E-08	--	--	--	6.8E-08	1.4E-09	7.3E+00	5.E-07	1.E-08
Benzo(b)fluoranthene	2.5E-01	1.6E-01	2.42E-07	1.99E-08	--	--	--	8.6E-08	1.7E-09	7.3E-01	6.E-08	1.E-09
Benzo(k)fluoranthene	1.9E-01	1.0E-01	1.86E-07	1.26E-08	--	--	--	6.6E-08	1.1E-09	7.3E-02	5.E-09	8.E-11
Chrysene	1.4E-01	6.0E-02	1.35E-07	7.34E-09	--	--	--	4.8E-08	6.3E-10	7.3E-03	4.E-10	5.E-12
Dibenz(a,h)anthracene	2.6E-01	1.2E-01	2.50E-07	1.44E-08	--	--	--	8.9E-08	1.2E-09	7.3E+00	7.E-07	9.E-09
Indeno(1,2,3-cd)pyrene	1.1E-01	5.5E-02	1.04E-07	6.73E-09	--	--	--	3.7E-08	5.8E-10	7.3E-01	3.E-08	4.E-10
Metals												
Cadmium	1.2E+00	7.8E-01	1.17E-06	9.54E-08	5.0E-04	2.E-03	2.E-04	4.2E-07	8.2E-09	--	--	--
Chromium	2.5E+01	1.6E+01	2.42E-05	1.98E-06	3.0E-03	8.E-03	7.E-04	8.6E-06	1.7E-07	--	--	--
			TOTAL HAZARD INDEX			1.E-02	9.E-04	TOTAL CANCER RISK			1.E-06	2.E-08

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**Notes:**

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

RfD = Reference Dose

CSF = Cancer Slope Factor

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**Table B-4 - ChevronTexaco Site Worker Risk Calculations**  
**Dermal Contact with Soil (Surface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	ABS	Soil EPC in mg/kg		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds													
1,2,4-Trimethylbenzene	--	5.3E+00	7.0E-01	--	--	5.0E-02	--	--	--	--	--	--	--
Toluene	--	1.8E-01	8.0E-02	--	--	2.0E-01	--	--	--	--	--	--	--
Xylenes (total)	--	6.6E-01	2.0E-01	--	--	2.0E-01	--	--	--	--	--	--	--
Semivolatile Organic Compounds													
Benzo(a)anthracene	0.13	2.1E-01	9.8E-02	8.6E-08	2.1E-09	--	--	--	3.1E-08	1.8E-10	7.3E-01	2.3E-08	1.3E-10
Benzo(a)pyrene	0.13	2.0E-01	1.4E-01	8.2E-08	2.9E-09	--	--	--	2.9E-08	2.5E-10	7.3E+00	2.1E-07	1.8E-09
Benzo(b)fluoranthene	0.13	2.5E-01	1.6E-01	1.0E-07	3.4E-09	--	--	--	3.7E-08	2.9E-10	7.3E-01	2.7E-08	2.1E-10
Benzo(k)fluoranthene	0.13	1.9E-01	1.0E-01	8.0E-08	2.2E-09	--	--	--	2.8E-08	1.9E-10	7.3E-02	2.1E-09	1.4E-11
Chrysene	0.13	1.4E-01	6.0E-02	5.8E-08	1.3E-09	--	--	--	2.1E-08	1.1E-10	7.3E-03	1.5E-10	7.9E-13
Dibenz(a,h)anthracene	0.13	2.6E-01	1.2E-01	1.1E-07	2.5E-09	--	--	--	3.8E-08	2.1E-10	7.3E+00	2.8E-07	1.5E-09
Indeno(1,2,3-cd)pyrene	0.13	1.1E-01	5.5E-02	4.4E-08	1.2E-09	--	--	--	1.6E-08	9.9E-11	7.3E-01	1.2E-08	7.2E-11
Metals													
Cadmium	0.001	1.2E+00	7.8E-01	3.9E-09	1.3E-10	1.3E-05	3.1E-04	1.0E-05	1.4E-09	1.1E-11	--	--	--
Chromium	--	2.5E+01	1.6E+01	--	--	7.5E-05	--	--	--	--	--	--	--
				TOTAL HAZARD INDEX			3.E-04	1.E-05	TOTAL CANCER RISK			6.E-07	4.E-09

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**Notes:**

ABS = Dermal Absorption Fraction (EPA, 2001)

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

RfD = Reference Dose

CSF = Cancer Slope Factor

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**Table B-4 - ChevronTexaco Site Worker Risk Calculations**  
**Indoor Air, Inhalation of Volatiles from Soil (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
1,2,4-Trimethylbenzene	5.3E+00	7.0E-01	8.4E+02	8.4E+02	6.E-03	8.E-04	--	--	--	--
Toluene	1.8E-01	1.1E-01	2.2E+03	2.2E+03	8.E-05	5.E-05	--	--	--	--
Xylenes (total)	4.5E-01	1.8E-01	1.3E+03	1.3E+03	3.E-04	1.E-04	--	--	--	--
<b>Semivolatile Organic Compounds</b>										
Naphthalene	5.2E-01	2.4E-01	3.4E+03	3.4E+03	2.E-04	7.E-05	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>7.E-03</b>	<b>1.E-03</b>	<b>TOTAL CANCER RISK</b>		<b>0.E+00</b>	<b>0.E+00</b>

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**Notes:**

Indoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-4 - ChevronTexaco Site Worker Risk Calculations**  
**Indoor Air, Inhalation of Volatiles from Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
1,2,4-Trimethylbenzene	4.8E+01	8.1E+00	5.1E+04	5.1E+04	9.E-04	2.E-04	--	--	--	--
Benzene	8.2E+03	6.3E+02	2.4E+05	2.4E+05	3.E-02	3.E-03	2.6E+03	1.1E+04	3.E-06	6.E-08
Methyl-tertbutyl-ether	3.8E+02	1.3E+02	1.6E+08	1.6E+08	2.E-06	8.E-07	1.5E+06	6.1E+06	3.E-10	2.E-11
Toluene	6.0E+03	7.0E+01	2.5E+06	2.5E+06	2.E-03	3.E-05	--	--	--	--
Xylenes (total)	3.1E+02	2.2E+02	7.1E+05	7.1E+05	4.E-04	3.E-04	--	--	--	--
<b>Semivolatile Organic Compounds</b>										
Naphthalene	1.2E+01	4.6E+00	3.5E+05	3.5E+05	3.E-05	1.E-05	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>4.E-02</b>	<b>3.E-03</b>	<b>TOTAL CANCER RISK</b>		<b>3.E-06</b>	<b>6.E-08</b>

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**Notes:**

Indoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-4 - ChevronTexaco Site Worker Risk Calculations**  
**Inhalation of Particulates (Surface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		Air EPC (1) in mg/3		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds														
1,2,4-Trimethylbenzene	5.3E+00	7.0E-01	4.0E-09	5.3E-10	2.7E-10	9.1E-12	1.7E-03	1.6E-07	5.4E-09	9.8E-11	7.8E-13	--	--	--
Toluene	1.8E-01	8.0E-02	1.4E-10	6.1E-11	9.4E-12	1.0E-12	1.1E-01	8.5E-11	9.4E-12	3.4E-12	8.9E-14	--	--	--
Xylenes (total)	6.6E-01	2.0E-01	5.0E-10	1.5E-10	3.4E-11	2.6E-12	2.9E-02	1.2E-09	9.0E-11	1.2E-11	2.2E-13	--	--	--
Semivolatile Organic Compounds														
Benzo(a)anthracene	2.1E-01	9.8E-02	1.6E-10	7.4E-11	1.1E-11	1.3E-12	--	--	--	3.8E-12	1.1E-13	7.3E-01	2.8E-12	8.0E-14
Benzo(a)pyrene	2.0E-01	1.4E-01	1.5E-10	1.0E-10	1.0E-11	1.8E-12	--	--	--	3.6E-12	1.5E-13	7.3E+00	2.6E-11	1.1E-12
Benzo(b)fluoranthene	2.5E-01	1.6E-01	1.9E-10	1.2E-10	1.3E-11	2.1E-12	--	--	--	4.6E-12	1.8E-13	7.3E-01	3.3E-12	1.3E-13
Benzo(k)fluoranthene	1.9E-01	1.0E-01	1.4E-10	7.8E-11	9.9E-12	1.3E-12	--	--	--	3.5E-12	1.1E-13	7.3E-02	2.6E-13	8.4E-15
Chrysene	1.4E-01	6.0E-02	1.0E-10	4.5E-11	7.2E-12	7.8E-13	--	--	--	2.6E-12	6.7E-14	7.3E-03	1.9E-14	4.9E-16
Dibenz(a,h)anthracene	2.6E-01	1.2E-01	1.9E-10	8.9E-11	1.3E-11	1.5E-12	--	--	--	4.7E-12	1.3E-13	7.3E+00	3.4E-11	9.6E-13
Indeno(1,2,3-cd)pyrene	1.1E-01	5.5E-02	8.0E-11	4.2E-11	5.5E-12	7.1E-13	--	--	--	2.0E-12	6.1E-14	7.3E-01	1.4E-12	4.5E-14
Metals														
Cadmium	1.2E+00	7.8E-01	9.1E-10	5.9E-10	6.2E-11	1.0E-11	--	--	--	2.2E-11	8.7E-13	6.3E+00	1.4E-10	5.5E-12
Chromium	2.5E+01	1.6E+01	1.9E-08	1.2E-08	1.3E-09	2.1E-10	2.9E-05	4.4E-05	7.3E-06	4.6E-10	1.8E-11	4.2E+01	1.9E-08	7.6E-10
					TOTAL HAZARD INDEX			4.E-05	7.E-06	TOTAL CANCER RISK			2.E-08	8.E-10

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**Notes:**(1) Air EPC calculated using  $PEF = 1.32E-09 \text{ m}^3/\text{kg}$  (Air EPC = Soil EPC/PEF)

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

PEF = Particulate Emission Factor

RfD = Reference Dose

CSF = Cancer Slope Factor

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**Table B-4 - ChevronTexaco Site Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Soil (Surface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		PEF in m³/kg	Air EPC (1) in mg/3		Hazard Intake in mg/kg-day		RfD In mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds															
1,2,4-Trimethylbenzene	5.3E+00	7.0E-01	2.0E+04	2.6E-04	3.5E-05	1.8E-05	6.0E-07	1.7E-03	1.1E-02	3.5E-04	6.5E-06	5.2E-08	--	--	--
Toluene	1.8E-01	8.0E-02	4.0E+03	4.5E-05	2.0E-05	3.1E-06	3.4E-07	1.1E-01	2.8E-05	3.1E-06	1.1E-06	2.9E-08	--	--	--
Xylenes (total)	6.6E-01	2.0E-01	6.1E+03	1.1E-04	3.3E-05	7.4E-06	5.6E-07	2.9E-02	2.6E-04	1.9E-05	2.7E-06	4.8E-08	--	--	--
TOTAL HAZARD INDEX									1.E-02	4.E-04	TOTAL CANCER RISK		0.E+00	0.E+00	

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**Notes:**

(1) Air EPC = Soil EPC/VF  
RME = Reasonable Maximum Exposure  
CT = Central Tendency  
EPC = Exposure Point Concentration  
VF = Volatilization Factor (EPA 2002)  
RfD = Reference Dose  
CSF = Cancer Slope Factor

**Table B-4 - ChevronTexaco Site Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Soil (Subsurface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil Concentration in mg/kg		Hazard RBC in mg/kg		Hazard Quotient		Cancer RBC in mg/kg		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
Toluene	6.4E-02	6.4E-02	4.0E+03	4.0E+03	2.E-05	2.E-05	--	--	--	--
Xylenes (total)	1.5E-01	1.5E-01	1.1E+04	1.1E+04	1.E-05	1.E-05	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>3.E-05</b>	<b>3.E-05</b>	<b>TOTAL CANCER RISK</b>		<b>0.E+00</b>	<b>0.E+00</b>

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**Notes:**

Outdoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-4 - ChevronTexaco Site Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
1,2,4-Trimethylbenzene	4.8E+01	8.1E+00	2.8E+05	2.8E+05	2.E-04	3.E-05	--	--	--	--
Benzene	8.2E+03	6.3E+02	1.2E+06	1.2E+06	7.E-03	5.E-04	1.3E+04	5.4E+04	6.E-07	1.E-08
Methyl-tertbutyl-ether	3.8E+02	1.3E+02	3.2E+08	3.2E+08	1.E-06	4.E-07	3.0E+06	1.3E+07	1.E-10	1.E-11
Toluene	6.0E+03	7.0E+01	1.4E+07	1.4E+07	4.E-04	5.E-06	--	--	--	--
Xylenes (total)	3.1E+02	2.2E+02	3.8E+06	3.8E+06	8.E-05	6.E-05	--	--	--	--
<b>Semivolatile Organic Compounds</b>										
Naphthalene	1.2E+01	4.6E+00	5.9E+05	5.9E+05	2.E-05	8.E-06	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>8.E-03</b>	<b>6.E-04</b>	<b>TOTAL CANCER RISK</b>		<b>6.E-07</b>	<b>1.E-08</b>

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**Notes:**

Outdoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-5 - ChevronTexaco Site Worker Risk Calculations (Groundwater Subareas)  
Indoor Air, Inhalation of Volatiles from Groundwater (Non-Chevron Ethanol Area)  
Willbridge Facility  
Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
1,2,4-Trimethylbenzene	4.8E+01	8.1E+00	5.1E+04	5.1E+04	9.E-04	2.E-04	--	--	--	--
Benzene	3.7E+02	6.4E+01	2.4E+05	2.4E+05	2.E-03	3.E-04	2.6E+03	1.1E+04	1.E-07	6.E-09
Toluene	8.5E+00	5.7E+00	2.5E+06	2.5E+06	3.E-06	2.E-06	--	--	--	--
Xylenes (total)	1.8E+01	1.1E+01	7.1E+05	7.1E+05	2.E-05	2.E-05	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>3.E-03</b>	<b>4.E-04</b>	<b>TOTAL CANCER RISK</b>		<b>1.E-07</b>	<b>6.E-09</b>

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**Notes:**

Indoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-5 - ChevronTexaco Site Worker Risk Calculations (Groundwater Subareas)  
Outdoor Air, Inhalation of Volatiles from Groundwater (Non-Chevron Ethanol Area)  
Willbridge Facility  
Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
1,2,4-Trimethylbenzene	4.8E+01	8.1E+00	2.8E+05	2.8E+05	2.E-04	3.E-05	--	--	--	--
Benzene	3.7E+02	6.4E+01	1.2E+06	1.2E+06	3.E-04	5.E-05	1.3E+04	5.4E+04	3.E-08	1.E-09
Toluene	8.5E+00	5.7E+00	1.4E+07	1.4E+07	6.E-07	4.E-07	--	--	--	--
Xylenes (total)	1.8E+01	1.1E+01	3.8E+06	3.8E+06	5.E-06	3.E-06	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>5.E-04</b>	<b>9.E-05</b>	<b>TOTAL CANCER RISK</b>		<b>3.E-08</b>	<b>1.E-09</b>

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**Notes:**

Outdoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration



**Table B-5 - ChevronTexaco Site Worker Risk Calculations (Groundwater Subareas)**  
**Indoor Air, Inhalation of Volatiles from Groundwater (Chevron Ethanol Area)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
Benzene	1.4E+04	1.1E+03	2.4E+05	2.4E+05	6.E-02	5.E-03	2.6E+03	1.1E+04	5.E-06	1.E-07
Methyl-tertbutyl-ether	3.8E+02	1.3E+02	1.6E+08	1.6E+08	2.E-06	8.E-07	1.5E+06	6.1E+06	3.E-10	2.E-11
Toluene	2.7E+02	1.3E+02	2.5E+06	2.5E+06	1.E-04	5.E-05	--	--	--	--
Xylenes (total)	3.7E+03	3.0E+02	7.1E+05	7.1E+05	5.E-03	4.E-04	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>6.E-02</b>	<b>5.E-03</b>	<b>TOTAL CANCER RISK</b>		<b>5.E-06</b>	<b>1.E-07</b>

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**Notes:**

Indoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-5 - ChevronTexaco Site Worker Risk Calculations (Groundwater Subareas)**  
**Outdoor Air, Inhalation of Volatiles from Groundwater (Chevron Ethanol Area)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
Benzene	1.4E+04	1.1E+03	1.2E+06	1.2E+06	1.E-02	9.E-04	1.3E+04	5.4E+04	1.E-06	2.E-08
Methyl-tertbutyl-ether	3.8E+02	1.3E+02	3.2E+08	3.2E+08	1.E-06	4.E-07	3.0E+06	1.3E+07	1.E-10	1.E-11
Toluene	2.7E+02	1.3E+02	1.4E+07	1.4E+07	2.E-05	9.E-06	--	--	--	--
Xylenes (total)	3.7E+03	3.0E+02	3.8E+06	3.8E+06	1.E-03	8.E-05	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>1.E-02</b>	<b>1.E-03</b>	<b>TOTAL CANCER RISK</b>		<b>1.E-06</b>	<b>2.E-08</b>

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**Notes:**

Outdoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-6 - ChevronTexaco Trench Worker Risk Calculations**  
**Soil Ingestion (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds												
1,2,4-Trimethylbenzene	5.3E+00	7.0E-01	6.14E-07	6.20E-09	5.0E-02	1.E-05	1.E-07	8.8E-09	8.9E-11	--	--	--
Toluene	1.8E-01	1.1E-01	2.08E-08	9.42E-10	2.0E-01	1.E-07	5.E-09	3.0E-10	1.3E-11	--	--	--
Xylenes (total)	4.5E-01	1.8E-01	5.28E-08	1.61E-09	2.0E-01	3.E-07	8.E-09	7.5E-10	2.3E-11	--	--	--
Semivolatile Organic Compounds												
Benzo(a)anthracene	3.4E-01	1.3E-01	3.89E-08	1.11E-09	--	--	--	5.6E-10	1.6E-11	7.3E-01	4.E-10	1.E-11
Benzo(a)pyrene	1.7E-01	1.1E-01	1.98E-08	9.60E-10	--	--	--	2.8E-10	1.4E-11	7.3E+00	2.E-09	1.E-10
Benzo(b)fluoranthene	2.0E-01	1.3E-01	2.28E-08	1.10E-09	--	--	--	3.3E-10	1.6E-11	7.3E-01	2.E-10	1.E-11
Benzo(k)fluoranthene	1.5E-01	1.5E-01	1.79E-08	1.36E-09	--	--	--	2.6E-10	1.9E-11	7.3E-02	2.E-11	1.E-12
Chrysene	1.0E-01	5.4E-02	1.17E-08	4.76E-10	--	--	--	1.7E-10	6.8E-12	7.3E-03	1.E-12	5.E-14
Dibenz(a,h)anthracene	1.8E-01	9.7E-02	2.07E-08	8.54E-10	--	--	--	3.0E-10	1.2E-11	7.3E+00	2.E-09	9.E-11
Indeno(1,2,3-cd)pyrene	5.2E-01	2.4E-01	6.08E-08	2.14E-09	--	--	--	8.7E-10	3.1E-11	7.3E-01	6.E-10	2.E-11
Metals												
Cadmium	1.2E+00	7.8E-01	1.39E-07	6.87E-09	5.0E-04	3.E-04	1.E-05	2.0E-09	9.8E-11	--	--	--
Chromium	2.5E+01	1.6E+01	2.87E-06	1.43E-07	3.0E-03	1.E-03	5.E-05	4.1E-08	2.0E-09	--	--	--
			TOTAL HAZARD INDEX			1.E-03	6.E-05	TOTAL CANCER RISK			6.E-09	2.E-10

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**Notes:**

RME = Reasonable Maximum Exposure  
CT = Central Tendency  
EPC = Exposure Point Concentration  
RfD = Reference Dose  
CSF = Cancer Slope Factor

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**Table B-6 - ChevronTexaco Trench Worker Risk Calculations**  
**Dermal Contact with Soil (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	ABS	Soil EPC in mg/kg		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds													
1,2,4-Trimethylbenzene	--	5.3E+00	7.0E-01	--	--	5.0E-02	--	--	--	--	--	--	--
Toluene	--	1.8E-01	1.1E-01	--	--	2.0E-01	--	--	--	--	--	--	--
Xylenes (total)	--	4.5E-01	1.8E-01	--	--	2.0E-01	--	--	--	--	--	--	--
Semivolatile Organic Compounds													
Benzo(a)anthracene	0.13	3.4E-01	1.3E-01	3.0E-08	9.5E-10	--	--	--	4.3E-10	1.4E-11	7.3E-01	3.2E-10	9.9E-12
Benzo(a)pyrene	0.13	1.7E-01	1.1E-01	1.5E-08	8.2E-10	--	--	--	2.2E-10	1.2E-11	7.3E+00	1.6E-09	8.6E-11
Benzo(b)fluoranthene	0.13	2.0E-01	1.3E-01	1.8E-08	9.4E-10	--	--	--	2.5E-10	1.3E-11	7.3E-01	1.9E-10	9.8E-12
Benzo(k)fluoranthene	0.13	1.5E-01	1.5E-01	1.4E-08	1.2E-09	--	--	--	2.0E-10	1.7E-11	7.3E-02	1.5E-11	1.2E-12
Chrysene	0.13	1.0E-01	5.4E-02	9.2E-09	4.1E-10	--	--	--	1.3E-10	5.8E-12	7.3E-03	9.6E-13	4.3E-14
Dibenz(a,h)anthracene	0.13	1.8E-01	9.7E-02	1.6E-08	7.3E-10	--	--	--	2.3E-10	1.0E-11	7.3E+00	1.7E-09	7.6E-11
Indeno(1,2,3-cd)pyrene	0.13	5.2E-01	2.4E-01	4.7E-08	1.8E-09	--	--	--	6.8E-10	2.6E-11	7.3E-01	4.9E-10	1.9E-11
Metals													
Cadmium	0.001	1.2E+00	7.8E-01	8.4E-10	4.5E-11	1.3E-05	6.7E-05	3.6E-06	1.2E-11	6.5E-13	--	--	--
Chromium	--	2.5E+01	1.6E+01	--	--	7.5E-05	--	--	--	--	--	--	--
				TOTAL HAZARD INDEX			7.E-05	4.E-06	TOTAL CANCER RISK			4.E-09	2.E-10

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**Notes:**

ABS = Dermal Absorption Fraction (EPA, 2001)  
RME = Reasonable Maximum Exposure  
CT = Central Tendency  
EPC = Exposure Point Concentration  
RfD = Reference Dose  
CSF = Cancer Slope Factor

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**Table B-6 - ChevronTexaco Trench Worker Risk Calculations**  
**Inhalation of Particulates (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		PEF in m³/kg	Air EPC (1) in mg/3		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds															
1,2,4-Trimethylbenzene	5.3E+00	7.0E-01	1.32E+09	4.0E-09	5.3E-10	9.9E-12	3.3E-13	1.7E-03	5.8E-09	1.9E-10	1.4E-13	4.7E-15	--	--	--
Toluene	1.8E-01	1.1E-01	1.32E+09	1.4E-10	8.1E-11	3.3E-13	5.0E-14	1.1E-01	3.0E-12	4.5E-13	4.8E-15	7.1E-16	--	--	--
Xylenes (total)	4.5E-01	1.8E-01	1.32E+09	3.4E-10	1.4E-10	8.5E-13	8.5E-14	2.9E-02	2.9E-11	2.9E-12	1.2E-14	1.2E-15	--	--	--
Semivolatile Organic Compounds															
Benzo(a)anthracene	3.4E-01	1.3E-01	1.32E+09	2.5E-10	9.5E-11	6.3E-13	5.9E-14	--	--	--	8.9E-15	8.4E-16	7.3E-01	6.5E-15	6.1E-16
Benzo(a)pyrene	1.7E-01	1.1E-01	1.32E+09	1.3E-10	8.3E-11	3.2E-13	5.1E-14	--	--	--	4.5E-15	7.3E-16	7.3E+00	3.3E-14	5.3E-15
Benzo(b)fluoranthene	2.0E-01	1.3E-01	1.32E+09	1.5E-10	9.5E-11	3.7E-13	5.8E-14	--	--	--	5.2E-15	8.3E-16	7.3E-01	3.8E-15	6.1E-16
Benzo(k)fluoranthene	1.5E-01	1.5E-01	1.32E+09	1.2E-10	1.2E-10	2.9E-13	7.2E-14	--	--	--	4.1E-15	1.0E-15	7.3E-02	3.0E-16	7.5E-17
Chrysene	1.0E-01	5.4E-02	1.32E+09	7.7E-11	4.1E-11	1.9E-13	2.5E-14	--	--	--	2.7E-15	3.6E-16	7.3E-03	2.0E-17	2.6E-18
Dibenz(a,h)anthracene	1.8E-01	9.7E-02	1.32E+09	1.3E-10	7.3E-11	3.3E-13	4.5E-14	--	--	--	4.8E-15	6.5E-16	7.3E+00	3.5E-14	4.7E-15
Indeno(1,2,3-cd)pyrene	5.2E-01	2.4E-01	1.32E+09	4.0E-10	1.8E-10	9.8E-13	1.1E-13	--	--	--	1.4E-14	1.6E-15	7.3E-01	1.0E-14	1.2E-15
Metals															
Cadmium	1.2E+00	7.8E-01	1.32E+09	9.1E-10	5.9E-10	2.2E-12	3.6E-13	--	--	--	3.2E-14	5.2E-15	6.3E+00	2.0E-13	3.3E-14
Chromium	2.5E+01	1.6E+01	1.32E+09	1.9E-08	1.2E-08	4.6E-11	7.6E-12	2.9E-05	1.6E-06	2.6E-07	6.6E-13	1.1E-13	4.2E+01	2.8E-11	4.5E-12
						TOTAL HAZARD INDEX			2.E-06	3.E-07	TOTAL CANCER RISK			3.E-11	5.E-12

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**Notes:**(1) Air EPC calculated using PEF = 1.32E-09 m<sup>3</sup>/kg (Air EPC = Soil EPC/PEF)

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

PEF = Particulate Emission Factor

RfD = Reference Dose

CSF = Cancer Slope Factor

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**Table B-6 - ChevronTexaco Trench Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Soil (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		VF in m³/kg	Air EPC (1) in mg/3		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds															
1,2,4-Trimethylbenzene	5.3E+00	7.0E-01	2.0E+04	2.6E-04	3.5E-05	6.5E-07	2.2E-08	1.7E-03	3.8E-04	1.3E-05	9.3E-09	3.1E-10	--	--	--
Toluene	1.8E-01	1.1E-01	4.0E+03	4.5E-05	2.7E-05	1.1E-07	1.6E-08	1.1E-01	1.0E-06	1.5E-07	1.6E-09	2.4E-10	--	--	--
Xylenes (total)	4.5E-01	1.8E-01	6.1E+03	7.4E-05	3.0E-05	1.8E-07	1.8E-08	2.9E-02	6.3E-06	6.4E-07	2.6E-09	2.6E-10	--	--	--
TOTAL HAZARD INDEX									4.E-04	1.E-05	TOTAL CANCER RISK			0.E+00	0.E+00

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**Notes:**

(1) Air EPC = Soil EPC/VF  
RME = Reasonable Maximum Exposure  
CT = Central Tendency  
EPC = Exposure Point Concentration  
VF = Volatilization Factor (EPA 2002)  
RfD = Reference Dose  
CSF = Cancer Slope Factor

**Table B-6 - ChevronTexaco Trench Worker Risk Calculations**  
**Inhalation of Volatiles and Dermal Contact with Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
1,2,4-Trimethylbenzene	4.8E+01	8.1E+00	1.2E+03	1.2E+03	4.E-02	7.E-03	--	--	--	--
Benzene	8.2E+03	6.3E+02	5.3E+04	5.3E+04	2.E-01	1.E-02	1.5E+03	3.0E+03	5.E-06	2.E-07
Methyl-tertbutyl-ether	3.8E+02	1.3E+02	6.9E+05	6.9E+05	5.E-04	2.E-04	1.4E+05	2.8E+05	3.E-09	5.E-10
Toluene	6.0E+03	7.0E+01	7.4E+04	7.4E+04	8.E-02	9.E-04	--	--	--	--
Xylenes (total)	3.1E+02	2.2E+02	2.1E+04	2.1E+04	1.E-02	1.E-02	--	--	--	--
<b>Semivolatile Organic Compounds</b>										
Benzo(a)anthracene	2.4E-01	1.6E-01	--	--	--	--	5.1E+00	1.0E+01	5.E-08	2.E-08
Benzo(a)pyrene	2.9E-01	1.9E-01	--	--	--	--	3.0E-01	6.0E-01	1.E-06	3.E-07
Benzo(b)fluoranthene	3.2E-01	2.0E-01	--	--	--	--	2.9E+00	5.9E+00	1.E-07	3.E-08
Benzo(k)fluoranthene	1.3E+00	1.4E-01	--	--	--	--	3.2E+01	6.3E+01	4.E-08	2.E-09
Indeno(1,2,3-cd)pyrene	2.5E-01	1.6E-01	--	--	--	--	1.6E+00	3.1E+00	2.E-07	5.E-08
Naphthalene	1.2E+01	4.6E+00	6.8E+02	6.8E+02	2.E-02	7.E-03	--	--	--	--
2-methylnaphthalene	4.1E+01	1.4E+01	6.8E+02	6.8E+02	6.E-02	2.E-02	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>4.E-01</b>	<b>6.E-02</b>	<b>TOTAL CANCER RISK</b>		<b>7.E-06</b>	<b>6.E-07</b>

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**Notes:**

Groundwater RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-6 - ChevronTexaco Trench Worker Risk Calculations**  
**Dermal Contact with Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater EPC in µg/L		DA <sub>water</sub> in mg/cm <sup>2</sup> /event		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day) <sup>-1</sup>	Cancer Risk	
	RME	CT	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Metals														
Arsenic	2.5E+01	2.3E+01	5.0E-08	4.6E-08	8.0E-09	3.7E-09	3.0E-04	2.7E-05	1.2E-05	2.8E-09	1.3E-09	1.5E+00	4.3E-09	2.0E-09
Cadmium	3.4E+00	2.0E+00	6.7E-09	3.9E-09	1.1E-09	3.1E-10	1.3E-05	8.7E-05	2.5E-05	3.9E-10	1.1E-10	--	--	--
Chromium	2.7E+01	1.6E+01	5.4E-08	3.2E-08	8.6E-09	2.6E-09	7.5E-05	1.2E-04	3.4E-05	3.1E-09	9.2E-10	--	--	--
					TOTAL HAZARD INDEX			2.E-04	7.E-05	TOTAL CANCER RISK			4.E-09	2.E-09

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**Notes:**

DA<sub>water</sub> = Dose absorbed per unit area per water contact event (DEQ, 2000)

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

RfD = Reference Dose

CSF = Cancer Slope Factor

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**Table B-7 - ChevronTexaco Trench Worker Risk Calculations (Groundwater Subareas)**  
**Inhalation of Volatiles and Dermal Contact with Groundwater (Non-Chevron Ethanol Area)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
1,2,4-Trimethylbenzene	4.8E+01	8.1E+00	1.2E+03	1.2E+03	4.E-02	7.E-03	--	--	--	--
Benzene	3.7E+02	6.4E+01	5.3E+04	5.3E+04	7.E-03	1.E-03	1.5E+03	3.0E+03	2.E-07	2.E-08
Toluene	8.5E+00	5.7E+00	7.4E+04	7.4E+04	1.E-04	8.E-05	--	--	--	--
Xylenes (total)	1.8E+01	1.1E+01	2.1E+04	2.1E+04	8.E-04	5.E-04	--	--	--	--
<b>Semivolatilve Organic Compounds</b>										
Benzo(a)anthracene	1.4E+00	1.5E-01	--	--	--	--	5.1E+00	1.0E+01	3.E-07	1.E-08
Benzo(a)pyrene	1.0E+00	1.3E-01	--	--	--	--	3.0E-01	6.0E-01	3.E-06	2.E-07
Benzo(b)fluoranthene	2.8E-01	1.7E-01	--	--	--	--	2.9E+00	5.9E+00	1.E-07	3.E-08
Benzo(k)fluoranthene	3.0E-01	1.2E-01	--	--	--	--	3.2E+01	6.3E+01	9.E-09	2.E-09
Dibenz(a,h)anthracene	1.6E-01	1.6E-01	--	--	--	--	1.1E-01	2.2E-01	1.E-06	7.E-07
Indeno(1,2,3-cd)pyrene	1.8E-01	1.2E-01	--	--	--	--	1.6E+00	3.1E+00	1.E-07	4.E-08
Naphthalene	1.3E+01	4.9E+00	6.8E+02	6.8E+02	2.E-02	7.E-03	--	--	--	--
2-methylnaphthalene	4.1E+01	1.4E+01	6.8E+02	6.8E+02	6.E-02	2.E-02	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>1.E-01</b>	<b>4.E-02</b>	<b>TOTAL CANCER RISK</b>		<b>6.E-06</b>	<b>1.E-06</b>

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**Notes:**

Groundwater RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-7 - ChevronTexaco Trench Worker Risk Calculations (Groundwater Subareas)**  
**Inhalation of Volatiles and Dermal Contact with Groundwater (Chevron Ethanol Area)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
Benzene	1.4E+04	1.1E+03	5.3E+04	5.3E+04	3.E-01	2.E-02	1.5E+03	3.0E+03	9.E-06	4.E-07
Methyl-tertbutyl-ether	3.8E+02	1.3E+02	6.9E+05	6.9E+05	5.E-04	2.E-04	1.4E+05	2.8E+05	3.E-09	5.E-10
Toluene	2.7E+02	1.3E+02	7.4E+04	7.4E+04	4.E-03	2.E-03	--	--	--	--
Xylenes (total)	3.7E+03	3.0E+02	2.1E+04	2.1E+04	2.E-01	1.E-02	--	--	--	--
<b>Semivolatile Organic Compounds</b>										
Benzo(a)anthracene	9.8E-01	3.5E-01	--	--	--	--	5.1E+00	1.0E+01	2.E-07	4.E-08
Benzo(a)pyrene	2.4E+00	8.9E-01	--	--	--	--	3.0E-01	6.0E-01	8.E-06	1.E-06
Benzo(b)fluoranthene	1.6E+00	6.6E-01	--	--	--	--	2.9E+00	5.9E+00	6.E-07	1.E-07
Benzo(k)fluoranthene	1.3E+00	4.2E-01	--	--	--	--	3.2E+01	6.3E+01	4.E-08	7.E-09
Dibenz(a,h)anthracene	3.4E+00	6.8E-01	--	--	--	--	1.1E-01	2.2E-01	3.E-05	3.E-06
Indeno(1,2,3-cd)pyrene	6.6E-01	2.5E-01	--	--	--	--	1.6E+00	3.1E+00	4.E-07	8.E-08
<b>TOTAL HAZARD QUOTIENT</b>					<b>4.E-01</b>	<b>4.E-02</b>	<b>TOTAL CANCER RISK</b>		<b>5.E-05</b>	<b>5.E-06</b>

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**Notes:**

Groundwater RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

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**Table B-8 - ChevronTexaco Landscape Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
Benzene	1.7E+03	1.7E+03	1.2E+06	1.2E+06	1.E-03	1.E-03	1.3E+04	5.4E+04	1.E-07	3.E-08
Toluene	9.1E+01	9.1E+01	1.4E+07	1.4E+07	7.E-06	7.E-06	--	--	--	--
Xylenes (total)	1.1E+02	1.1E+02	3.8E+06	3.8E+06	3.E-05	3.E-05	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>1.E-03</b>	<b>1.E-03</b>	<b>TOTAL CANCER RISK</b>		<b>1.E-07</b>	<b>3.E-08</b>

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**Notes:**

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-9 - ConocoPhillips Site Worker Risk Calculations**  
**Soil Ingestion (Surface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF In (mg/kg-day)-1	Cancer Risk	
	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds												
Benzene	2.4E-01	3.7E-02	2.32E-07	4.53E-09	4.0E-03	6.E-05	1.E-06	8.3E-08	3.9E-10	5.5E-02	5.E-09	2.E-11
Xylenes (total)	1.8E+00	1.3E-01	1.75E-06	1.61E-08	2.0E-01	9.E-06	8.E-08	6.3E-07	1.4E-09	--	--	--
Semivolatlive Organic Compounds												
Benzo(a)anthracene	1.5E-01	5.7E-02	1.48E-07	6.97E-09	--	--	--	5.3E-08	6.0E-10	7.3E-01	4.E-08	4.E-10
Benzo(a)pyrene	2.4E-01	7.2E-02	2.35E-07	8.81E-09	--	--	--	8.4E-08	7.5E-10	7.3E+00	6.E-07	6.E-09
Benzo(b)fluoranthene	2.8E-01	8.3E-02	2.75E-07	1.02E-08	--	--	--	9.8E-08	8.7E-10	7.3E-01	7.E-08	6.E-10
Chrysene	1.7E-01	5.7E-02	1.62E-07	6.97E-09	--	--	--	5.8E-08	6.0E-10	7.3E-03	4.E-10	4.E-12
Dibenz(a,h)anthracene	6.5E-02	2.8E-02	6.36E-08	3.42E-09	--	--	--	2.3E-08	2.9E-10	7.3E+00	2.E-07	2.E-09
Metals												
Barium	9.2E+01	8.0E+01	8.96E-05	9.76E-06	7.0E-02	1.E-03	1.E-04	3.2E-05	8.4E-07	--	--	--
Chromium	1.9E+01	1.5E+01	1.83E-05	1.79E-06	3.0E-03	6.E-03	6.E-04	6.5E-06	1.5E-07	--	--	--
			TOTAL HAZARD INDEX			7.E-03	7.E-04	TOTAL CANCER RISK			9.E-07	9.E-09

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**Notes:**

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

RfD = Reference Dose

CSF = Cancer Slope Factor

**Table B-9 - ConocoPhillips Site Worker Risk Calculations**  
**Dermal Contact with Soil (Surface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	ABS	Soil EPC in mg/kg		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds													
Benzene	--	2.4E-01	3.7E-02	--	--	4.0E-03	--	--	--	--	5.5E-02	--	--
Xylenes (total)	--	1.8E+00	1.3E-01	--	--	2.0E-01	--	--	--	--	--	--	--
Semivolatlve Organic Compounds													
Benzo(a)anthracene	0.13	1.5E-01	5.7E-02	6.3E-08	1.2E-09	--	--	--	2.3E-08	1.0E-10	7.3E-01	1.7E-08	7.5E-11
Benzo(a)pyrene	0.13	2.4E-01	7.2E-02	1.0E-07	1.5E-09	--	--	--	3.6E-08	1.3E-10	7.3E+00	2.6E-07	9.5E-10
Benzo(b)fluoranthene	0.13	2.8E-01	8.3E-02	1.2E-07	1.7E-09	--	--	--	4.2E-08	1.5E-10	7.3E-01	3.1E-08	1.1E-10
Chrysene	0.13	1.7E-01	5.7E-02	7.0E-08	1.2E-09	--	--	--	2.5E-08	1.0E-10	7.3E-03	1.8E-10	7.5E-13
Dibenz(a,h)anthracene	0.13	6.5E-02	2.8E-02	2.7E-08	5.9E-10	--	--	--	9.7E-09	5.0E-11	7.3E+00	7.1E-08	3.7E-10
Metals													
Barium	--	9.2E+01	8.0E+01	--	--	7.0E-02	--	--	--	--	--	--	--
Chromium	--	1.9E+01	1.5E+01	--	--	7.5E-05	--	--	--	--	--	--	--
				TOTAL HAZARD INDEX			0.E+00	0.E+00	TOTAL CANCER RISK			4.E-07	1.E-09

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**Notes:**

ABS = Dermal Absorption Fraction (EPA, 2001)  
RME = Reasonable Maximum Exposure  
CT = Central Tendency  
EPC = Exposure Point Concentration  
RfD = Reference Dose  
CSF = Cancer Slope Factor

**Table B-9 - ConocoPhillips Site Worker Risk Calculations**  
**Indoor Air, Inhalation of Volatiles from Soil (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil Concentration in mg/kg		Hazard RBC in mg/kg		Hazard Quotient		Cancer RBC in mg/kg		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
Benzene	8.6E-02	4.8E-02	8.4E+01	8.4E+01	1.E-03	6.E-04	9.0E-01	9.0E-01	1.E-07	5.E-08
Xylenes (total)	1.8E+00	1.2E-01	1.3E+03	1.3E+03	1.E-03	9.E-05	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>2.E-03</b>	<b>7.E-04</b>	<b>TOTAL CANCER RISK</b>		<b>1.E-07</b>	<b>5.E-08</b>

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**Notes:**

Indoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)  
RME = Reasonable Maximum Exposure  
CT = Central Tendency  
RBC = Risk-Based Concentration

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**Table B-9 - ConocoPhillips Site Worker Risk Calculations**  
**Indoor Air, Inhalation of Volatiles from Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
Volatile Organic Compounds										
1,2,4-Trimethylbenzene	6.5E+01	1.0E+01	5.2E+04	5.2E+04	1.E-03	2.E-04	--	--	--	--
1,3,5-Trimethylbenzene	3.6E+01	6.9E+00	3.9E+04	3.9E+04	9.E-04	2.E-04	--	--	--	--
Benzene	8.6E+01	5.1E+01	2.4E+05	2.4E+05	4.E-04	2.E-04	2.6E+03	1.1E+04	3.E-08	5.E-09
n-propylbenzene	2.5E+02	4.8E+01	5.5E+05	5.5E+05	5.E-04	9.E-05	--	--	--	--
Xylenes (total)	2.3E+01	1.2E+01	7.2E+05	7.2E+05	3.E-05	2.E-05	--	--	--	--
Semivolatile Organic Compounds										
Naphthalene	5.4E+00	4.8E+00	3.6E+05	3.6E+05	2.E-05	1.E-05	--	--	--	--
TOTAL HAZARD QUOTIENT					3.E-03	7.E-04	TOTAL CANCER RISK		3.E-08	5.E-09

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**Notes:**

Indoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-9 - ConocoPhillips Site Worker Risk Calculations**  
**Inhalation of Particulates (Surface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		Air EPC (1) in mg/3		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds														
Benzene	2.4E-01	3.7E-02	1.8E-10	2.8E-11	1.2E-11	4.8E-13	9.0E-03	1.4E-09	5.3E-11	4.4E-12	4.1E-14	2.9E-02	1.3E-13	1.2E-15
Xylenes (total)	1.8E+00	1.3E-01	1.4E-09	1.0E-10	9.3E-11	1.7E-12	2.9E-02	3.2E-09	5.9E-11	3.3E-11	1.5E-13	--	--	--
Semivolatile Organic Compounds														
Benzo(a)anthracene	1.5E-01	5.7E-02	1.1E-10	4.3E-11	7.8E-12	7.4E-13	--	--	--	2.8E-12	6.3E-14	7.3E-01	2.0E-12	4.6E-14
Benzo(a)pyrene	2.4E-01	7.2E-02	1.8E-10	5.5E-11	1.2E-11	9.3E-13	--	--	--	4.4E-12	8.0E-14	7.3E+00	3.2E-11	5.8E-13
Benzo(b)fluoranthene	2.8E-01	8.3E-02	2.1E-10	6.3E-11	1.5E-11	1.1E-12	--	--	--	5.2E-12	9.2E-14	7.3E-01	3.8E-12	6.7E-14
Chrysene	1.7E-01	5.7E-02	1.3E-10	4.3E-11	8.6E-12	7.4E-13	--	--	--	3.1E-12	6.3E-14	7.3E-03	2.2E-14	4.6E-16
Dibenz(a,h)anthracene	6.5E-02	2.8E-02	4.9E-11	2.1E-11	3.4E-12	3.6E-13	--	--	--	1.2E-12	3.1E-14	7.3E+00	8.8E-12	2.3E-13
Metals														
Barium	9.2E+01	8.0E+01	6.9E-08	6.0E-08	4.8E-09	1.0E-09	1.4E-04	3.4E-05	7.4E-06	1.7E-09	8.9E-11	--	--	--
Chromium	1.9E+01	1.5E+01	1.4E-08	1.1E-08	9.7E-10	1.9E-10	2.9E-05	3.3E-05	6.5E-06	3.5E-10	1.6E-11	4.2E+01	1.5E-08	6.8E-10
					TOTAL HAZARD INDEX			7.E-05	1.E-05	TOTAL CANCER RISK			1.E-08	7.E-10

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**Notes:**(1) Air EPC calculated using PEF = 1.32E-09 m<sup>3</sup>/kg (Air EPC = Soil EPC/PEF)

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

PEF = Particulate Emission Factor

RfD = Reference Dose

CSF = Cancer Slope Factor



**Table B-9 - ConocoPhillips Site Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Soil (Surface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		VF in m³/kg	Air EPC (1) in mg/3		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk		
	RME	CT		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT	
Volatile Organic Compounds																
Benzene	2.4E-01	3.7E-02	2.7E+03	8.8E-05	1.4E-05	6.0E-06	2.3E-07	9.0E-03	6.7E-04	2.6E-05	2.1E-06	2.0E-08	2.9E-02	6.2E-08	5.8E-10	
Xylenes (total)	1.8E+00	1.3E-01	6.1E+03	2.9E-04	2.2E-05	2.0E-05	3.7E-07	2.9E-02	6.9E-04	1.3E-05	7.2E-06	3.2E-08	--	--	--	
TOTAL HAZARD INDEX									1.E-03	4.E-05	TOTAL CANCER RISK				6.E-08	6.E-10

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**Notes:**

(1) Air EPC = Soil EPC/VF  
RME = Reasonable Maximum Exposure  
CT = Central Tendency  
EPC = Exposure Point Concentration  
VF = Volatilization Factor (EPA 2002)  
RfD = Reference Dose  
CSF = Cancer Slope Factor

**Table B-9 - ConocoPhillips Site Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Soil (Subsurface Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil Concentration in mg/kg		Hazard RBC in mg/kg		Hazard Quotient		Cancer RBC in mg/kg		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
Benzene	1.3E-01	5.9E-02	2.0E+03	2.0E+03	6.E-05	3.E-05	2.2E+01	2.2E+01	6.E-09	3.E-09
Xylenes (total)	5.9E-01	9.8E-02	6.5E+03	6.5E+03	9.E-05	2.E-05	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>2.E-04</b>	<b>4.E-05</b>	<b>TOTAL CANCER RISK</b>		<b>6.E-09</b>	<b>3.E-09</b>

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**Notes:**

Outdoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-9 - ConocoPhillips Site Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
1,2,4-Trimethylbenzene	6.5E+01	1.0E+01	2.9E+05	2.9E+05	2.E-04	3.E-05	--	--	--	--
1,3,5-Trimethylbenzene	3.6E+01	6.9E+00	2.4E+05	2.4E+05	2.E-04	3.E-05	--	--	--	--
Benzene	8.6E+01	5.1E+01	1.3E+06	1.3E+06	7.E-05	4.E-05	1.4E+04	5.8E+04	6.E-09	9.E-10
n-propylbenzene	2.5E+02	4.8E+01	3.6E+06	3.6E+06	7.E-05	1.E-05	--	--	--	--
Xylenes (total)	2.3E+01	1.2E+01	4.1E+06	4.1E+06	6.E-06	3.E-06	--	--	--	--
<b>Semivolatile Organic Compounds</b>										
Naphthalene	5.4E+00	4.8E+00	7.4E+05	7.4E+05	7.E-06	6.E-06	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>5.E-04</b>	<b>1.E-04</b>	<b>TOTAL CANCER RISK</b>		<b>6.E-09</b>	<b>9.E-10</b>

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**Notes:**

Outdoor Air RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

**Table B-10 - ConocoPhillips Trench Worker Risk Calculations**  
**Soil Ingestion (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds												
Benzene	8.6E-02	4.8E-02	9.97E-09	4.23E-10	4.0E-03	2.E-06	1.E-07	1.4E-10	6.0E-12	5.5E-02	8.E-12	3.E-13
Xylenes (total)	1.8E+00	1.2E-01	2.08E-07	1.01E-09	2.0E-01	1.E-06	5.E-09	3.0E-09	1.4E-11	--	--	--
Semivolatile Organic Compounds												
Benzo(a)anthracene	6.6E-02	4.0E-02	7.67E-09	3.52E-10	--	--	--	1.1E-10	5.0E-12	7.3E-01	8.E-11	4.E-12
Benzo(a)pyrene	9.6E-02	4.8E-02	1.12E-08	4.23E-10	--	--	--	1.6E-10	6.0E-12	7.3E+00	1.E-09	4.E-11
Benzo(b)fluoranthene	9.5E-02	5.4E-02	1.10E-08	4.76E-10	--	--	--	1.6E-10	6.8E-12	7.3E-01	1.E-10	5.E-12
Chrysene	7.3E-02	3.9E-02	8.49E-09	3.43E-10	--	--	--	1.2E-10	4.9E-12	7.3E-03	9.E-13	4.E-14
Dibenz(a,h)anthracene	3.4E-02	2.1E-02	3.95E-09	1.85E-10	--	--	--	5.6E-11	2.6E-12	7.3E+00	4.E-10	2.E-11
Metals												
Barium	9.2E+01	8.1E+01	1.06E-05	7.12E-07	7.0E-02	2.E-04	1.E-05	1.5E-07	1.0E-08	--	--	--
Chromium	1.9E+01	1.4E+01	2.17E-06	1.24E-07	3.0E-03	7.E-04	4.E-05	3.1E-08	1.8E-09	--	--	--
			TOTAL HAZARD INDEX			9.E-04	5.E-05	TOTAL CANCER RISK			2.E-09	7.E-11

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**Notes:**

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

RfD = Reference Dose

CSF = Cancer Slope Factor

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**Table B-10 - ConocoPhillips Trench Worker Risk Calculations**  
**Dermal Contact with Soil (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	ABS	Soil EPC in mg/kg		Hazard Intake in mg/kg/day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg/day		CSF in (mg/kg-day)-1	Cancer Risk	
		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds													
Benzene	--	8.6E-02	4.8E-02	--	--	4.0E-03	--	--	--	--	5.5E-02	--	--
Xylenes (total)	--	1.8E+00	1.2E-01	--	--	2.0E-01	--	--	--	--	--	--	--
Semivolatile Organic Compounds													
Benzo(a)anthracene	0.13	6.6E-02	4.0E-02	6.0E-09	3.0E-10	--	--	--	8.5E-11	4.3E-12	7.3E-01	6.2E-11	3.2E-12
Benzo(a)pyrene	0.13	9.6E-02	4.8E-02	8.7E-09	3.6E-10	--	--	--	1.2E-10	5.2E-12	7.3E+00	9.1E-10	3.8E-11
Benzo(b)fluoranthene	0.13	9.5E-02	5.4E-02	8.6E-09	4.1E-10	--	--	--	1.2E-10	5.8E-12	7.3E-01	9.0E-11	4.3E-12
Chrysene	0.13	7.3E-02	3.9E-02	6.6E-09	2.9E-10	--	--	--	9.5E-11	4.2E-12	7.3E-03	6.9E-13	3.1E-14
Dibenz(a,h)anthracene	0.13	3.4E-02	2.1E-02	3.1E-09	1.6E-10	--	--	--	4.4E-11	2.3E-12	7.3E+00	3.2E-10	1.7E-11
Metals													
Barium	--	9.2E+01	8.1E+01	--	--	7.0E-02	--	--	--	--	--	--	--
Chromium	--	1.9E+01	1.4E+01	--	--	7.5E-05	--	--	--	--	--	--	--
				TOTAL HAZARD INDEX			0.E+00	0.E+00	TOTAL CANCER RISK			1.E-09	6.E-11

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**Notes:**

ABS = Dermal Absorption Fraction (EPA, 2001)  
RME = Reasonable Maximum Exposure  
CT = Central Tendency  
EPC = Exposure Point Concentration

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**Table B-10 - ConocoPhillips Trench Worker Risk Calculations**  
**Inhalation of Particulates (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		Air EPC (1) in mg/3		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds														
Benzene	8.6E-02	4.8E-02	6.5E-11	3.6E-11	1.6E-13	2.2E-14	9.0E-03	1.8E-11	2.5E-12	2.3E-15	3.2E-16	2.9E-02	6.6E-17	9.3E-18
Xylenes (total)	1.8E+00	1.2E-01	1.4E-09	8.7E-11	3.3E-12	5.4E-14	2.9E-02	1.2E-10	1.9E-12	4.8E-14	7.7E-16	--	--	--
Semivolatile Organic Compounds														
Benzo(a)anthracene	6.6E-02	4.0E-02	5.0E-11	3.0E-11	1.2E-13	1.9E-14	--	--	--	1.8E-15	2.7E-16	7.3E-01	1.3E-15	1.9E-16
Benzo(a)pyrene	9.6E-02	4.8E-02	7.3E-11	3.6E-11	1.8E-13	2.2E-14	--	--	--	2.6E-15	3.2E-16	7.3E+00	1.9E-14	2.3E-15
Benzo(b)fluoranthene	9.5E-02	5.4E-02	7.2E-11	4.1E-11	1.8E-13	2.5E-14	--	--	--	2.5E-15	3.6E-16	7.3E-01	1.9E-15	2.6E-16
Chrysene	7.3E-02	3.9E-02	5.5E-11	3.0E-11	1.4E-13	1.8E-14	--	--	--	1.9E-15	2.6E-16	7.3E-03	1.4E-17	1.9E-18
Dibenz(a,h)anthracene	3.4E-02	2.1E-02	2.6E-11	1.6E-11	6.4E-14	9.8E-15	--	--	--	9.1E-16	1.4E-16	7.3E+00	6.6E-15	1.0E-15
Metals														
Barium	9.2E+01	8.1E+01	6.9E-08	6.1E-08	1.7E-10	3.8E-11	1.4E-04	1.2E-06	2.7E-07	2.4E-12	5.4E-13	--	--	--
Chromium	1.9E+01	1.4E+01	1.4E-08	1.1E-08	3.5E-11	6.6E-12	2.9E-05	1.2E-06	2.3E-07	5.0E-13	9.4E-14	4.2E+01	2.1E-11	4.0E-12
					TOTAL HAZARD INDEX			2.E-06	5.E-07	TOTAL CANCER RISK			2.E-11	4.E-12

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**Notes:**

(1) Air EPC calculated using  $PEF = 1.32E-09 \text{ m}^3/\text{kg}$  (Air EPC = Soil EPC/PEF)

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

PEF = Particulate Emission Factor

RfD = Reference Dose

CSF = Cancer Slope Factor

**Table B-10 - ConocoPhillips Trench Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Soil (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		VF in m³/kg	Air EPC (1) in mg/3		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds															
Benzene	8.6E-02	4.8E-02	2.7E+03	3.2E-05	1.8E-05	7.8E-08	1.1E-08	9.0E-03	8.7E-06	1.2E-06	1.1E-09	1.6E-10	2.9E-02	3.2E-11	4.5E-12
Xylenes (total)	1.8E+00	1.2E-01	6.1E+03	2.9E-04	1.9E-05	7.2E-07	1.2E-08	2.9E-02	2.5E-05	4.0E-07	1.0E-08	1.7E-10	--	--	--
						TOTAL HAZARD INDEX			3.E-05	2.E-06	TOTAL CANCER RISK			3.E-11	5.E-12

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**Notes:**

(1) Air EPC = Soil EPC/VF  
RME = Reasonable Maximum Exposure  
CT = Central Tendency  
EPC = Exposure Point Concentration  
VF = Volatilization Factor (EPA 2002)  
RfD = Reference Dose  
CSF = Cancer Slope Factor

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**Table B-10 - ConocoPhillips Trench Worker Risk Calculations**  
**Inhalation of Volatiles and Dermal Contact with Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
1,2,4-Trimethylbenzene	6.5E+01	1.0E+01	1.2E+03	1.2E+03	5.E-02	8.E-03	--	--	--	--
1,3,5-Trimethylbenzene	3.6E+01	6.9E+00	1.3E+03	1.3E+03	3.E-02	5.E-03	--	--	--	--
Benzene	8.6E+01	5.1E+01	5.3E+03	5.3E+03	2.E-02	1.E-02	1.5E+03	3.0E+03	6.E-08	2.E-08
n-propylbenzene	2.5E+02	4.8E+01	9.3E+03	9.3E+03	3.E-02	5.E-03	--	--	--	--
Xylenes (total)	2.3E+01	1.2E+01	2.1E+04	2.1E+04	1.E-03	6.E-04	--	--	--	--
<b>Semivolatilve Organic Compounds</b>										
Benzo(a)anthracene	2.0E+00	7.7E-01	--	--	--	--	5.1E+00	1.0E+01	4.E-07	8.E-08
Benzo(b)fluoranthene	3.7E+00	6.8E-01	--	--	--	--	2.9E+00	5.9E+00	1.E-06	1.E-07
Chrysene	1.2E+00	5.4E-01	--	--	--	--	5.1E+02	1.0E+03	2.E-09	5.E-10
Naphthalene	5.4E+00	4.8E+00	6.8E+02	6.8E+02	8.E-03	7.E-03	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>1.E-01</b>	<b>4.E-02</b>	<b>TOTAL CANCER RISK</b>		<b>2.E-06</b>	<b>2.E-07</b>

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**Notes:**

Groundwater RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration



**Table B-10 - ConocoPhillips Trench Worker Risk Calculations**  
**Dermal Contact with Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater EPC in $\mu\text{g/L}$		$\text{DA}_{\text{water}}$ in $\text{mg/cm}^2/\text{event}$		Hazard Intake in $\text{mg/kg-day}$		RfD in $\text{mg/kg-day}$	Hazard Quotient		Cancer Intake in $\text{mg/kg-day}$		CSF in $(\text{mg/kg-day})^{-1}$	Cancer Risk	
	RME	CT	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Metals														
Arsenic	9.4E+01	5.8E+01	1.9E-07	1.2E-07	3.0E-08	9.4E-09	3.0E-04	1.0E-04	3.1E-05	1.1E-08	3.4E-09	1.5E+00	1.6E-08	5.0E-09
Barium	3.1E+02	2.0E+02	6.1E-07	4.0E-07	9.8E-08	3.2E-08	7.0E-02	1.4E-06	4.6E-07	3.5E-08	1.1E-08	--	--	--
Chromium	9.1E+01	2.3E+01	1.8E-07	4.6E-08	2.9E-08	3.7E-09	7.5E-05	3.9E-04	4.9E-05	1.0E-08	1.3E-09	--	--	--
					TOTAL HAZARD INDEX			5.E-04	8.E-05	TOTAL CANCER RISK			2.E-08	5.E-09

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**Notes:**

$\text{DA}_{\text{water}}$  = Dose absorbed per unit area per water contact event (DEQ, 2000)

RME = Reasonable Maximum Exposure

CT = Central Tendency.

EPC = Exposure Point Concentration

RfD = Reference Dose

CSF = Cancer Slope Factor

**Table B-11 - Willbridge Terminal Utility Worker Risk Calculations**  
**Soil Ingestion (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds												
n-propylbenzene	2.4E+00	3.9E-01	2.82E-07	3.43E-09	4.0E-02	7.E-06	9.E-08	4.0E-09	4.9E-11	--	--	--
Xylenes (total)	3.8E+00	1.7E-01	4.41E-07	1.50E-09	2.0E-01	2.E-06	7.E-09	6.3E-09	2.1E-11	--	--	--
Semivolatilve Organic Compounds												
Benzo(a)anthracene	1.0E-01	5.0E-02	1.16E-08	4.40E-10	--	--	--	1.7E-10	6.3E-12	7.3E-01	1.E-10	5.E-12
Benzo(a)pyrene	1.1E-01	5.0E-02	1.28E-08	4.40E-10	--	--	--	1.8E-10	6.3E-12	7.3E+00	1.E-09	5.E-11
Benzo(b)fluoranthene	8.0E-02	4.0E-02	9.30E-09	3.52E-10	--	--	--	1.3E-10	5.0E-12	7.3E-01	1.E-10	4.E-12
Dibenz(a,h)anthracene	4.5E-02	4.5E-02	5.18E-09	3.93E-10	--	--	--	7.4E-11	5.6E-12	7.3E+00	5.E-10	4.E-11
Indeno(1,2,3-cd)pyrene	1.0E-01	3.0E-02	1.20E-08	2.64E-10	--	--	--	1.7E-10	3.8E-12	7.3E-01	1.E-10	3.E-12
Naphthalene	1.0E-01	2.0E-02	1.19E-08	1.76E-10	2.0E-02	6.E-07	9.E-09	1.7E-10	2.5E-12	--	--	--
Metals												
Arsenic	5.2E+00	3.4E+00	6.07E-07	2.96E-08	3.0E-04	2.E-03	1.E-04	8.7E-09	4.2E-10	1.5E+00	1.E-08	6.E-10
Chromium	2.1E+01	1.9E+01	2.43E-06	1.63E-07	3.0E-03	8.E-04	5.E-05	3.5E-08	2.3E-09	--	--	--
			TOTAL HAZARD INDEX			3.E-03	2.E-04	TOTAL CANCER RISK			2.E-08	7.E-10

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**Notes:**

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

RfD = Reference Dose

CSF = Cancer Slope Factor

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**Table B-11 - Willbridge Terminal Utility Worker Risk Calculations**  
**Dermal Contact with Soil (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	ABS	Soil EPC in mg/kg		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds													
n-propylbenzene	--	2.4E+00	3.9E-01	--	--	4.0E-02	--	--	--	--	--	--	--
Xylenes (total)	--	3.8E+00	1.7E-01	--	--	2.0E-01	--	--	--	--	--	--	--
Semivolatile Organic Compounds													
Benzo(a)anthracene	0.13	1.0E-01	5.0E-02	9.1E-09	3.8E-10	--	--	--	1.3E-10	5.4E-12	7.3E-01	9.5E-11	3.9E-12
Benzo(a)pyrene	0.13	1.1E-01	5.0E-02	1.0E-08	3.8E-10	--	--	--	1.4E-10	5.4E-12	7.3E+00	1.0E-09	3.9E-11
Benzo(b)fluoranthene	0.13	8.0E-02	4.0E-02	7.3E-09	3.0E-10	--	--	--	1.0E-10	4.3E-12	7.3E-01	7.6E-11	3.2E-12
Dibenz(a,h)anthracene	0.13	4.5E-02	4.5E-02	4.0E-09	3.4E-10	--	--	--	5.8E-11	4.8E-12	7.3E+00	4.2E-10	3.5E-11
Indeno(1,2,3-cd)pyrene	0.13	1.0E-01	3.0E-02	9.3E-09	2.3E-10	--	--	--	1.3E-10	3.2E-12	7.3E-01	9.7E-11	2.4E-12
Naphthalene	0.13	1.0E-01	2.0E-02	9.2E-09	1.5E-10	2.0E-02	4.6E-07	7.6E-09	1.3E-10	2.2E-12	--	--	--
Metals													
Arsenic	--	5.2E+00	3.4E+00	--	--	3.0E-04	--	--	--	--	1.5E+00	--	--
Chromium	--	2.1E+01	1.9E+01	--	--	7.5E-05	--	--	--	--	--	--	--
				TOTAL HAZARD INDEX			5.E-07	8.E-09	TOTAL CANCER RISK			2.E-09	8.E-11

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**Notes:**

ABS = Dermal Absorption Fraction (EPA, 2001)  
RME = Reasonable Maximum Exposure  
CT = Central Tendency  
EPC = Exposure Point Concentration  
RfD = Reference Dose  
CSF = Cancer Slope Factor

**Table B-11 - Willbridge Terminal Utility Worker Risk Calculations**  
**Inhalation of Particulates (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		Air EPC (1) in mg/3		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds														
n-propylbenzene	2.4E+00	3.9E-01	1.8E-09	3.0E-10	4.5E-12	1.8E-13	4.0E-02	1.1E-10	4.6E-12	6.5E-14	2.6E-15	--	--	--
Xylenes (total)	3.8E+00	1.7E-01	2.9E-09	1.3E-10	7.1E-12	7.9E-14	2.9E-02	2.4E-10	2.7E-12	1.0E-13	1.1E-15	--	--	--
Semivolatile Organic Compounds														
Benzo(a)anthracene	1.0E-01	5.0E-02	7.6E-11	3.8E-11	1.9E-13	2.3E-14	--	--	--	2.7E-15	3.3E-16	7.3E-01	1.9E-15	2.4E-16
Benzo(a)pyrene	1.1E-01	5.0E-02	8.3E-11	3.8E-11	2.1E-13	2.3E-14	--	--	--	2.9E-15	3.3E-16	7.3E+00	2.1E-14	2.4E-15
Benzo(b)fluoranthene	8.0E-02	4.0E-02	6.1E-11	3.0E-11	1.5E-13	1.9E-14	--	--	--	2.1E-15	2.7E-16	7.3E-01	1.6E-15	1.9E-16
Dibenz(a,h)anthracene	4.5E-02	4.5E-02	3.4E-11	3.4E-11	8.3E-14	2.1E-14	--	--	--	1.2E-15	3.0E-16	7.3E+00	8.7E-15	2.2E-15
Indeno(1,2,3-cd)pyrene	1.0E-01	3.0E-02	7.8E-11	2.3E-11	1.9E-13	1.4E-14	--	--	--	2.7E-15	2.0E-16	7.3E-01	2.0E-15	1.5E-16
Naphthalene	1.0E-01	2.0E-02	7.7E-11	1.5E-11	1.9E-13	9.3E-15	8.6E-04	2.2E-10	1.1E-11	2.7E-15	1.3E-16	--	--	--
Metals														
Arsenic	5.2E+00	3.4E+00	4.0E-09	2.5E-09	9.8E-12	1.6E-12	--	--	--	1.4E-13	2.2E-14	1.5E+01	2.1E-12	3.4E-13
Chromium	2.1E+01	1.9E+01	1.6E-08	1.4E-08	3.9E-11	8.7E-12	2.9E-05	1.3E-06	3.0E-07	5.6E-13	1.2E-13	4.2E+01	2.3E-11	5.2E-12
					TOTAL HAZARD INDEX			1.E-06	3.E-07	TOTAL CANCER RISK			3.E-11	6.E-12

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**Notes:**(1) Air EPC calculated using  $PEF = 1.32E-09 \text{ m}^3/\text{kg}$  (Air EPC = Soil EPC/PEF)

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

PEF = Particulate Emission Factor

RfD = Reference Dose

CSF = Cancer Slope Factor

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**Table B-11 - Willbridge Terminal Utility Worker Risk Calculations**  
**Outdoor Air, Inhalation of Volatiles from Soil (Total Soil)**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Soil EPC in mg/kg		VF in m³/kg	Air EPC (1) in mg/3		Hazard Intake in mg/kg-day		RfD in mg/kg-day	Hazard Quotient		Cancer Intake in mg/kg-day		CSF in (mg/kg-day)-1	Cancer Risk	
	RME	CT		RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Volatile Organic Compounds															
n-propylbenzene	2.4E+00	3.9E-01	1.1E+04	2.2E-04	3.5E-05	5.4E-07	2.2E-08	4.0E-02	1.4E-05	5.5E-07	7.8E-09	3.1E-10	--	--	--
Xylenes (total)	3.8E+00	1.7E-01	6.1E+03	6.2E-04	2.8E-05	1.5E-06	1.7E-08	2.9E-02	5.3E-05	5.9E-07	2.2E-08	2.5E-10	--	--	--
						TOTAL HAZARD INDEX			7.E-05	1.E-06	TOTAL CANCER RISK			0.E+00	0.E+00

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**Notes:**

(1) Air EPC = Soil EPC/VF

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

VF = Volatilization Factor (EPA 2002)

RfD = Reference Dose

CSF = Cancer Slope Factor

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**Table B-11 - Willbridge Terminal Utility Worker Risk Calculations**  
**Inhalation of Volatiles and Dermal Contact with Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater Concentration in µg/L		Hazard RBC in µg/L		Hazard Quotient		Cancer RBC in µg/L		Cancer Risk	
	RME	CT	RME	CT	RME	CT	RME	CT	RME	CT
<b>Volatile Organic Compounds</b>										
1,2,4-Trimethylbenzene	6.5E+01	1.8E+01	1.2E+03	1.2E+03	5.E-02	1.E-02	--	--	--	--
1,3,5-Trimethylbenzene	3.6E+01	9.4E+00	1.3E+03	1.3E+03	3.E-02	7.E-03	--	--	--	--
Benzene	1.9E+02	3.6E+01	5.3E+03	5.3E+03	4.E-02	7.E-03	1.5E+03	3.0E+03	1.E-07	1.E-08
n-propylbenzene	2.5E+02	6.0E+01	9.3E+03	9.3E+03	3.E-02	7.E-03	--	--	--	--
Xylenes (total)	2.5E+01	1.4E+01	2.1E+04	2.1E+04	1.E-03	7.E-04	--	--	--	--
<b>Semivolatilive Organic Compounds</b>										
Benzo(a)anthracene	1.3E+00	9.7E-01	--	--	--	--	5.1E+00	1.0E+01	2.E-07	1.E-07
Benzo(a)pyrene	2.0E-01	2.0E-01	--	--	--	--	3.0E-01	6.0E-01	7.E-07	3.E-07
Benzo(b)fluoranthene	5.5E-01	5.5E-01	--	--	--	--	2.9E+00	5.9E+00	2.E-07	9.E-08
Indeno(1,2,3-cd)pyrene	1.0E-01	1.0E-01	--	--	--	--	1.6E+00	3.1E+00	6.E-08	3.E-08
Naphthalene	9.1E+01	5.5E+00	6.8E+02	6.8E+02	1.E-01	8.E-03	--	--	--	--
2-methylnaphthalene	4.1E+01	1.7E+01	6.8E+02	6.8E+02	6.E-02	3.E-02	--	--	--	--
<b>TOTAL HAZARD QUOTIENT</b>					<b>3.E-01</b>	<b>7.E-02</b>	<b>TOTAL CANCER RISK</b>		<b>1.E-06</b>	<b>6.E-07</b>

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**Notes:**

Groundwater RBCs were calculated using DEQ's RBDM Guidance (DEQ, 2003)

RME = Reasonable Maximum Exposure

CT = Central Tendency

RBC = Risk-Based Concentration

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**Table B-11 - Willbridge Terminal Utility Worker Risk Calculations**  
**Dermal Contact with Groundwater**  
**Willbridge Facility**  
**Portland, Oregon**

Compounds of Potential Concern	Groundwater EPC in $\mu\text{g/L}$		$\text{DA}_{\text{water}}$ in $\text{mg/cm}^2/\text{event}$		Hazard Intake in $\text{mg/kg-day}$		RfD in $\text{mg/kg-day}$	Hazard Quotient		Cancer Intake in $\text{mg/kg-day}$		CSF in $(\text{mg/kg-day})^{-1}$	Cancer Risk	
	RME	CT	RME	CT	RME	CT		RME	CT	RME	CT		RME	CT
Metals														
Arsenic	1.2E+02	2.2E+01	2.3E-07	4.5E-08	3.7E-08	3.6E-09	3.0E-04	1.2E-04	1.2E-05	1.3E-08	1.3E-09	1.5E+00	2.0E-08	1.9E-09
Cadmium	3.6E+01	1.8E+00	7.1E-08	3.6E-09	1.1E-08	2.9E-10	1.3E-05	9.1E-04	2.3E-05	4.1E-09	1.0E-10	--	--	--
Chromium	2.2E+01	1.4E+01	4.5E-08	2.8E-08	7.2E-09	2.2E-09	7.5E-05	9.6E-05	3.0E-05	2.6E-09	8.0E-10	--	--	--
					TOTAL HAZARD INDEX			1.E-03	7.E-05	TOTAL CANCER RISK			2.E-08	2.E-09

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**Notes:**

DA<sub>water</sub> = Dose absorbed per unit are per water contact event (DEQ, 2000)

RME = Reasonable Maximum Exposure

CT = Central Tendency

EPC = Exposure Point Concentration

RfD = Reference Dose

CSF = Cancer Slope Factor

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**APPENDIX F**

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**ETHANOL STUDY PAPER/ANALYTICAL RESULTS**



## ETHANOL IN GROUNDWATER AT A NORTHWEST TERMINAL

*Timothy E. Buscheck* and Kirk O'Reilly (Chevron Research and Technology Company, Richmond, CA, USA)  
Gerard Koschal (PNG Environmental, Tigard, OR, USA)  
Gerald O'Regan, (Chevron Products Company, San Ramon, CA, USA)

**ABSTRACT:** In March 1999, a 19,000-gallon release of neat ethanol occurred from an aboveground storage tank at a Bulk Fuel Terminal located in the Northwest United States ("Northwest Terminal"). Ethanol is completely miscible in water and at high concentrations (>20,000 mg/L) can enhance the solubilization of benzene, toluene, ethylbenzene, and the xylenes (BTEX) from nonaqueous phase liquid (NAPL). Ethanol can be degraded in both aerobic and anaerobic environments. The presence of ethanol appears to enhance the mobility of NAPL, as shown by increasing apparent NAPL thickness in two monitoring wells. Cosolvent effects of ethanol are suggested by increasing benzene concentrations in one downgradient monitoring well. The presence of ethanol has created a strongly anaerobic groundwater system, demonstrated by low or nondetectable dissolved oxygen, depleted sulfate and nitrate, and elevated methane concentrations. The detection of acetate in downgradient monitoring wells provides evidence for ethanol biodegradation.

### INTRODUCTION

The Northwest Terminal began petroleum-processing operations in 1911, distributing and blending a variety of refined petroleum products, including gasoline, diesel, Bunker C oil, stove oil, turbine oil, transmission fluid and lubrication oils (Kline, 2001). Two other terminals located to the southeast and northwest border the Northwest Terminal.

On March 20, 1999, a 19,000-gallon release of neat ethanol occurred from Tank 58 at the Northwest Terminal. Historical groundwater monitoring data were available from existing monitoring wells to delineate a pre-existing dissolved hydrocarbon plume. On March 30, 1999 four existing monitoring wells were sampled and analyzed for BTEX, total petroleum hydrocarbons (TPH), and ethanol. In June and July of 1999, nine monitoring wells were installed to delineate ethanol and hydrocarbons in the subsurface. These wells were sampled six times between June 1999 and December 2000. Since May 2000 the groundwater sampling protocol has included analytes for in situ bioremediation. In December 2000, eight additional monitoring wells were installed.

### GEOLOGIC AND HYDROGEOLOGIC SETTING

The hydrogeologic setting consists of a layer of fill on top of alluvium (Kline, 2001). The fill is very loose to medium dense and fine to medium grained sand and silty sand. The thickness of the fill material ranges from nonexistent to greater than 30 feet (9 m). In general, the alluvium is very soft to medium stiff

clayey silt with sand and organics. The alluvium is often interbedded with silty clays and clays. The alluvium occurs to a depth of approximately 50 feet (15.2 m) below grade, where basaltic material is present.

The fill and the alluvium are hydraulically connected. The units discharge to a local river, located approximately 1500 feet to the east. The fill may be locally perched on the alluvial unit. The direction of groundwater flow is generally toward the river at approximately 0.01 ft/ft. The fill layer is the primary zone for the occurrence of hydrocarbons. The underlying alluvium is, in some locations, less permeable and may provide an aquitard.

Water levels beneath the site are influenced by annual precipitation cycles and by river stage fluctuations. The depths to water typically range from 4 to 14 feet (1.2 to 4.3 m) below grade. Based on an effective porosity of 40 percent and a hydraulic conductivity of 35 feet per day (10.7 m per day) (based on field tests), the groundwater velocity within the fill material is estimated to be 300 to 400 feet per year (92 to 123 m per year) (Kline, 2001).

### **ETHANOL DEGRADATION PATHWAYS**

In the presence of ethanol, biodegradation of BTEX in groundwater may be inhibited, potentially increasing hydrocarbon plume lengths. Ethanol can be degraded in both aerobic and anaerobic environments. Microbial degradation of ethanol generates a variety of metabolic intermediates and end products (Alvarez and Hunt, 1999). Oxygen can be quickly depleted by microbial aerobic respiration in hydrocarbon-contaminated aquifers. Therefore, ethanol is likely to be degraded under anaerobic conditions at field sites.

**Aerobic Degradation.** Most common aerobic bacteria can oxidize ethanol through the Krebs cycle (Brock and Madigan, 1991). The intermediates include acetaldehyde and acetyl coenzyme A (acetyl-CoA). Carbon dioxide (CO<sub>2</sub>) is a final degradation product. The intermediates of the common metabolic pathways are not toxic. They are metabolized rapidly intracellularly and are unlikely to accumulate in groundwater; one exception is acetic acid bacteria, which excrete acetate (Alvarez and Hunt, 1999). However, acetate will degrade under either aerobic or anaerobic conditions.

**Anaerobic Pathways.** Microorganisms that can ferment ethanol are ubiquitous (Alvarez and Hunt, 1999). Ethanol is a common intermediate in the anaerobic food chain, where labile organic matter is degraded to nontoxic products by the combined action of several different types of bacteria. These nontoxic products include acetate, CO<sub>2</sub>, methane (CH<sub>4</sub>), and hydrogen gas (H<sub>2</sub>) (Alvarez and Hunt, 1999). First stage fermenters produce simple organic acids, alcohols, hydrogen gas, and CO<sub>2</sub>. In the second stage, obligate proton reducers, sulfate-reducers, and acetogens produce acetate, H<sub>2</sub>, and CO<sub>2</sub>. In the third stage, methanogens mineralize acetate to CO<sub>2</sub> and CH<sub>4</sub> (Alvarez and Hunt, 1999). The most important CO<sub>2</sub>-reducing bacteria are the methanogens (Brock and Madigan, 1991).

**Ethanol Degradation Rates in Groundwater.** The rate of ethanol degradation under either aerobic or anaerobic conditions is faster than the degradation rates of other gasoline constituents (Corseuil, et al., 1998). First-order, laboratory ethanol degradation half-lives measured by Corseuil et al. (1998) varied from 1 to 7 days, depending on the electron acceptor. The only field-scale studies with fuel-alcohol releases have been conducted with methanol. In a field study at Canadian Forces Base Borden, Ontario, Canada, a blend of 85% methanol and 15% gasoline (M85 fuel) was released in a shallow, sandy aquifer (API, 1994). Methanol was biodegraded from an initial concentration of 7000 mg/L to below 1 mg/L in 476 days, equating to a degradation rate of  $0.019 \text{ day}^{-1}$  (36-day half-life). The biodegradation rates for methanol and ethanol are expected to be fairly similar.

**Potential Effects of Ethanol on BTEX Biodegradation.** Ethanol concentrations above 40,000 mg/L have been shown to inhibit oxygen utilization by indigenous organisms. (Hunt et al., 1997). With 10% ethanol in ethanol-blended gasoline, ethanol concentrations measured at underground storage tank (UST) release sites should not have a significant impact on BTEX biodegradation (da Silva et al., 2001). However, depletion of electron acceptors by ethanol degrading organisms will reduce their availability to BTEX degraders. Competition for electron acceptors could lead to a decrease in the BTEX intrinsic biodegradation rate and potentially result in longer BTEX plumes.

In microcosm experiments conducted by Hunt et al. (1997), the presence of 300 mg/L or less of ethanol did not slow benzene and toluene degradation by *Pseudomonas putida* F1 (PpF1), but a slight inhibitory effect was observed at 500 mg/L ethanol. However, the simultaneous utilization of ethanol and toluene as growth substrates for PpF1 represents a caveat against generalizations about the effect of fuel additives on BTEX degradation patterns (Hunt et al., 1997). Additional research is needed to define the effect of ethanol on BTEX biodegradation.

Corseuil et al. (1998) conducted laboratory experiments under aerobic conditions. They found that ethanol depleted the available oxygen, creating anaerobic conditions. These authors suggest that because benzene degrades more slowly under anaerobic conditions, it could migrate further in groundwater than it would without ethanol's presence.

## EVIDENCE FOR BIODEGRADATION OF ETHANOL

Figure 1 illustrates the December 2000 groundwater contours and the location of former Tank 58. Groundwater flow is generally toward the east, in the direction of the river. Figure 2 shows the ethanol concentrations for December 2000 (methane and acetate are also included and are discussed below).

**Evidence of Rapid Plume Attenuation.** During the 18-month monitoring period (June 1999 through December 2000) the furthest downgradient occurrence of ethanol was in CR-16 at 4,170 ug/L on September 20, 1999. Six months after the release, ethanol had migrated 250 feet (76 m) from Tank 58, consistent with groundwater velocities. This was the only date on which ethanol was detected in CR-16 and ethanol has never been detected above the practical quantitation limit



Ethanol was not detected above the PQL in any of the downgradient monitoring wells sampled in December 2000 for the first time. Acetate was analyzed in December samples from the new downgradient monitoring wells (GPW-1, GPW-3, and CR-21A through CR-25) and well CR-19. Acetate was detected in two of these new wells at concentrations of 256 mg/L (CR-23B) and 237 mg/L (GPW-1). In August 2000 acetate was analyzed in all the groundwater samples (CR-6 through CR-20) but was measured above a detection limit of 1.7 mg/L in only one well, at 38 mg/L in CR-19. The December 2000 spatial distribution of acetate is illustrated in Figure 2. Based on the December groundwater results, the ethanol plume appears to be adequately defined by the existing monitoring well network.

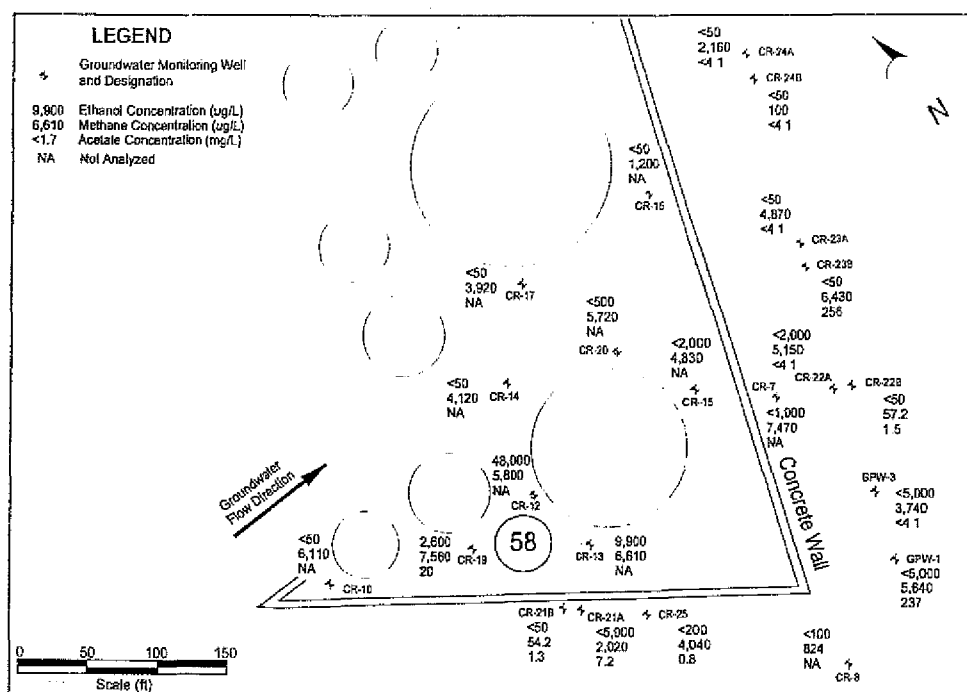


FIGURE 2. December 2000 Ethanol, Methane, and Acetate Concentrations

**Evidence of Residual Ethanol in Vadose Zone Soils.** Monitoring wells CR-12 and CR-13 are located downgradient, within 40 feet of former Tank 58. The highest ethanol concentrations ever measured at the terminal occurred in CR-12 and CR-13, at 16,100,000 ug/L and 4,740,000 ug/L, respectively. These concentrations were measured less than three months after the March 1999 ethanol release (June 9, 1999). Figure 3 is a plot for CR-12 ethanol concentration and depth to groundwater versus time. Between June 1999 and August 2000, ethanol concentrations followed a steady decline in CR-12, further evidence of ethanol attenuation. On August 15, 2000 ethanol was not detected above the PQL of 50 ug/L. On December 15, 2000 the ethanol concentration was 48,000 ug/L (PQL of 2000 ug/L). Total petroleum hydrocarbon concentration increased from 6800 to 16,000 ug/L between August and December, which likely contributed to the higher PQL in December. The duplicate groundwater samples obtained in

both August and December 2000 show good agreement in the ethanol concentrations. Figure 3 suggests the depth to groundwater did not vary between August and December. However, significant rainfall in early December, prior to the sampling event, likely explains the increased ethanol concentrations in CR-12 resulting from infiltrating rainwater contacting residual ethanol that remains in the vadose zone.

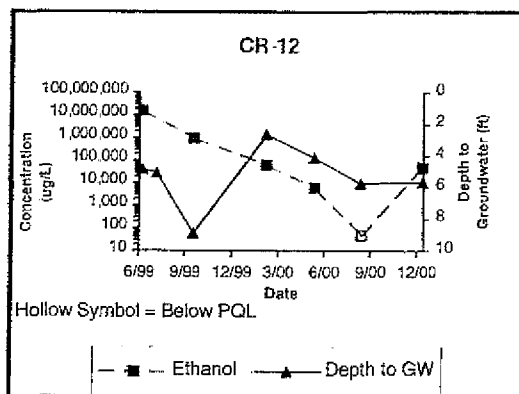


FIGURE 3. Ethanol and Depth to Groundwater

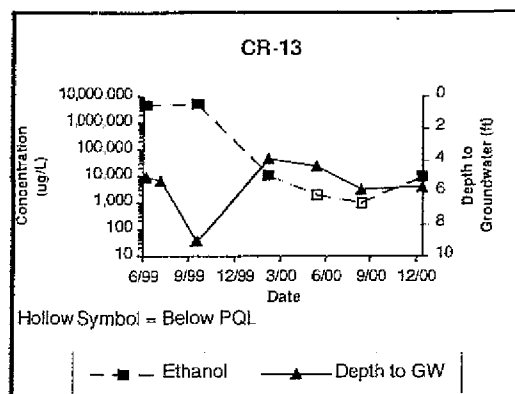


FIGURE 4. Ethanol and Depth to Groundwater

Figure 4 is a plot for CR-13 ethanol concentration and depth to groundwater versus time. In August 2000 ethanol was not detected at the PQL of 1000 ug/L, almost 5000 times below the June 1999 concentration. In December ethanol was detected at 9,900 ug/L. As was observed in CR-12, the rebound in ethanol concentration suggests that residual ethanol remains in the vadose zone.

### IMPACT OF ETHANOL ON HYDROCARBONS

The presence of ethanol has impacted hydrocarbon in both the NAPL and dissolved phases.

**Evidence of Increased Mobility of Pre-existing NAPL.** Monitoring well CR-19 is located within 20 feet (9 m), southwest of former Tank 58. The greatest NAPL thickness measured in the vicinity of the ethanol release has occurred in well CR-19. Figure 5 illustrates NAPL thickness and groundwater elevation for CR-19. These plots show the water table decline of 2 feet (0.6 m) through the summer of 1999 and the water table rise by as much as 3 feet (0.9 m) in the winter of 2000. Through the winter of 2000, NAPL thickness remained constant in CR-19 (approximately 2.5 feet (0.8 m)). In May 2000 NAPL was bailed from this well and recovered very slowly. However, the NAPL thickness of 2.79 feet (0.85 m) in December 2000 is the greatest thickness measured over the 18-month monitoring period. NAPL was also present in well CR-15 (downgradient of Tank 58) and varied from nonmeasurable in June 1999 to 0.44 feet (0.13 m) in September 1999. This NAPL occurrence may also have been influenced by the presence of ethanol, detected on one sampling event in CR-15 above the PQL (4,000 ug/L in February 2000).

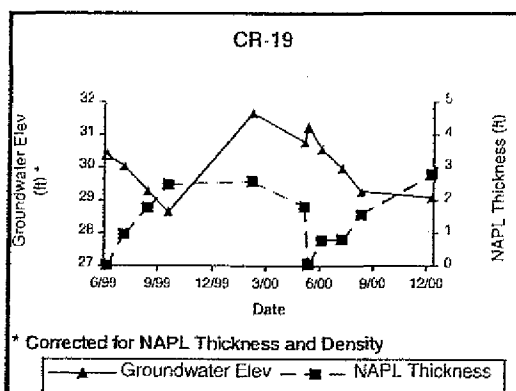


FIGURE 5. NAPL and Groundwater Elevation

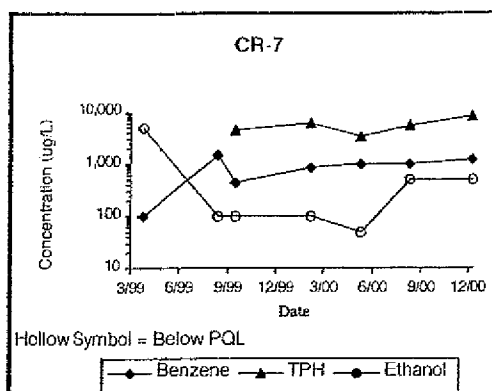


FIGURE 6. Ethanol, Benzene, and TPH

**Evidence of Benzene Cosolvency.** Well CR-7 is located approximately 200 feet (61 m) downgradient of former Tank 58 (within 50 feet of CR-15). Ethanol has never been detected in CR-7 above the PQL. Figure 6 is a plot of ethanol, benzene, and TPH-gasoline versus time in CR-7. The March 30, 1999 sampling event occurred ten days after the ethanol release and given the distance between Tank 58 and CR-7, those analytical results provide a baseline condition. Benzene concentration increased by a factor of 15 in this well between March 30 and August 17, 1999. Throughout 2000, benzene concentrations remained about ten times above the March 1999 levels. Two factors could contribute to increased benzene concentrations in CR-7: (1) enhanced dissolution resulting from NAPL occurrence in upgradient CR-15 and (2) upgradient, elevated ethanol concentrations in CR-12 and CR-13, exerting a high demand for electron acceptors. CR-7 provides potential evidence for cosolvent effects of ethanol on benzene.

## SUMMARY

Seventeen new monitoring wells were installed over an 18-month period in response to a March 1999, 19,000-gallon neat ethanol release. These wells provide adequate delineation of the ethanol plume. Within six months after the release, ethanol was detected 250 feet (76 m) downgradient (CR-16), but shortly afterward the plume appeared to attenuate. Ethanol concentrations have significantly declined in two monitoring wells directly downgradient of the ethanol release (CR-12 and CR-13). December 2000 ethanol concentrations increased in these two wells, compared to earlier trends, suggesting some residual ethanol remains in the vadose zone.

The presence of ethanol has affected pre-existing petroleum hydrocarbon in both the NAPL and the dissolved phases. However, ethanol concentrations at UST release sites (10% ethanol in ethanol-gasoline mixtures) are not likely to have the same impact on a hydrocarbon plume. NAPL thickness in one near-source monitoring well (CR-19) has exceeded 2 feet (0.6 m) and is sustained during water table fluctuations. March 1999 data (pre-release) from the

downgradient well, CR-7, coupled with increasing benzene concentrations in that well, suggest a possible cosolvent effect resulting from the presence of ethanol.

The presence of ethanol has created a strongly anaerobic groundwater system, demonstrated by low or nondetectable DO, depleted sulfate and nitrate, and elevated methane concentrations. Declining ethanol concentrations in near-source monitoring wells, the lack of ethanol downgradient, and acetate detections in downgradient wells provide evidence for ethanol biodegradation.

#### ACKNOWLEDGEMENTS

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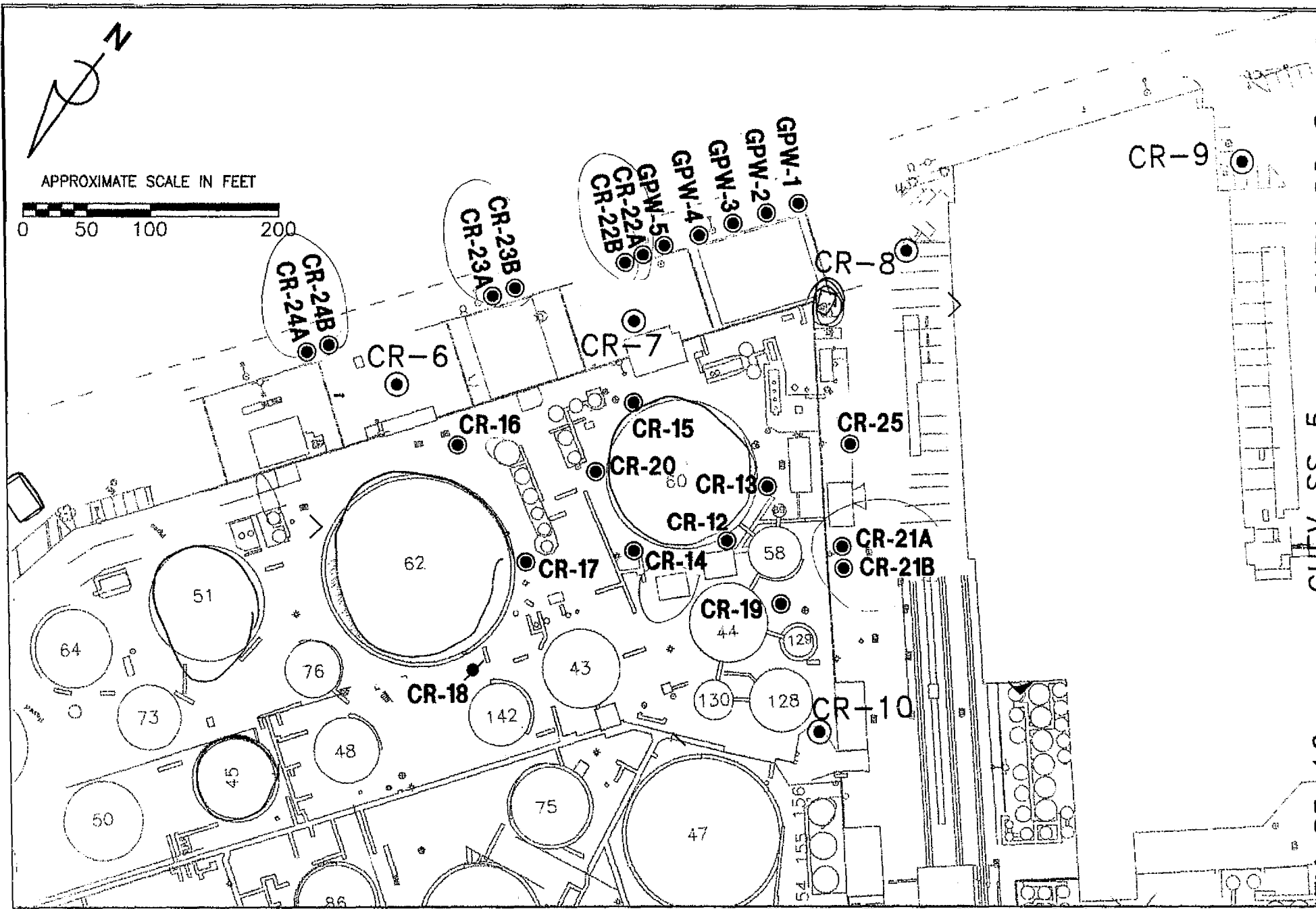
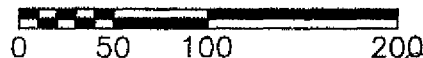
#### REFERENCES

- Alvarez, P.J.J. and C.S. Hunt. 1999. "Volume 4: Potential Ground and Surface Water Impacts, Chapter 3: The Effect of Ethanol on BTEX Biodegradation and Natural Attenuation." G. Cannon and D. Rice, (Eds.) Published by the State of California, UCRL-AR-135949. (<http://www-erd.llnl.gov/ethanol/>)
- API. 1994. *Transport and Fate of Dissolved Methanol, Methyl-Tertiary-Butyl-Ether, and Monoaromatic Hydrocarbons in a Shallow Aquifer*. API Publication Number 4601, April 1994.
- Brock, T.D. and M.T. Madigan. 1991. *Biology of Microorganisms*. Prentice Hall, Englewood Cliffs, N.J.
- Corseuil, H.X. and P.J.J. Alvarez. 1996. "Natural Bioremediation Perspective for BTX-Contaminated Groundwater in Brazil: Effect of Ethanol." *Water Science Technology* 34(7-8): 311-318.
- Corseuil, H.X., C.S. Hunt, R. dos Santos Ferreira, and P.J.J. Alvarez. 1998. "The Influence of the Gasoline Oxygenate Ethanol on Aerobic and Anaerobic BTX Biodegradation." *Water Research* 32(7): 2065-2072.
- da Silva, M.L.B., G.M. Ruiz, J.M. Fernandez, H.R. Beller, and P.J.J. Alvarez. 2001. "Effect of Ethanol versus MTBE on BTEX Natural Attenuation." In *In Situ and On-Site Bioremediation: The Sixth International Symposium*. San Diego, CA, June 4-7, 2001.
- Hunt, C.S., P.J.J. Alvarez, R. dos Santos Ferreira, and H.X. Corseuil. 1997. "Effect of Ethanol on Aerobic BTEX Degradation." In B.C. Alleman and A.L. Leeson (Eds.) *In Situ and On-Site Bioremediation*, 4(1): 49-54. Battelle Press, Columbus, OH.
- Kline, K. 2001. Personal Communication. KHM Environmental Management, Inc.





APPROXIMATE SCALE IN FEET



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CAD FILE NAME: CHEV01  
DRAWN BY: SKB  
APPROVED BY: GK

**WILLBRIDGE TERMINAL  
SOIL EXCAVATION MAP  
PORTLAND, OREGON**

**FACILITY MAP  
CHEVRON BULK TERMINAL**

Project No.  
875-08

Figure No.

1

COP0020723

Table 1  
VOC Water Analytical Results  
Chevron Willbridge Terminal  
Portland, Oregon

Parameters	GPW1-01 10/09/00 (ug/L)	GPW2-01 10/09/00 (ug/L)	GPW3-01 10/09/00 (ug/L)	GPW4-01 10/09/00 (ug/L)	GPW5-01 10/09/00 (ug/L)	GPW601 10/09/2000 (ug/L)
Acetone	100 U	500 U	1000 U	500 U	200 U	100 U
Benzene	1,580	6,950	13,900	8,470	3,140	1,220
Bromobenzene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Bromochloromethane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Bromodichloromethane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Bromoform	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Bromomethane	50.0 U	250 U	500 U	250 U	100 U	50.0 U
2-Butanone	100 U	500 U	1000 U	500 U	200 U	100 U
n-Butylbenzene	50.0 U	250 U	500 U	250 U	100 U	50.0 U
sec-Butylbenzene	20.3	50.0 U	100 U	50.0 U	20.0 U	15.5
tert-Butylbenzene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Carbon disulfide	100 U	500 U	1000 U	500 U	200 U	100 U
Carbon tetrachloride	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Chlorobenzene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Chloroethane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Chloroform	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Chloromethane	50.0 U	250 U	500 U	250 U	100 U	50.0 U
2-Chlorotoluene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
4-Chlorotoluene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,2-Dibromo-3-chloropropane	50.0 U	250 U	500 U	250 U	100 U	50.0 U
Dibromochloromethane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,2-Dibromoethane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Dibromomethane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,2-Dichlorobenzene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,3-Dichlorobenzene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,4-Dichlorobenzene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Dichlorodifluoromethane	50.0 U	250 U	500 U	250 U	100 U	50.0 U
1,1-Dichloroethane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,2-Dichloroethane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,1-Dichloroethene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
cis-1,2-Dichloroethene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
trans-1,2-Dichloroethene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,2-Dichloropropane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,3-Dichloropropane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
2,2-Dichloropropane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,1-Dichloropropene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
cis-1,3-Dichloropropene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
trans-1,3-Dichloropropene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U

ble 1  
**VOC Water Analytical Results**  
Chevron Willbridge Terminal  
Portland, Oregon

Parameters	GPW1-01 10/09/00 (ug/L)	GPW2-01 10/09/00 (ug/L)	GPW3-01 10/09/00 (ug/L)	GPW4-01 10/09/00 (ug/L)	GPW5-01 10/09/00 (ug/L)	GPW601 10/09/2000 (ug/L)
Ethylbenzene	193	364	2,040	339	89.8	51.2
Hexachlorobutadiene	20.0 U	100 U	200 U	100 U	40.0 U	20.0 U
2-Hexanone	100 U	500 U	1000 U	500 U	200 U	100 U
Isopropylbenzene	129	123	200 U	132	89.6	75.5
p-Isopropyltoluene	20.0 U	100 U	200 U	100 U	40.0 U	20.0 U
4-Methyl-2-pentanone	50.0 U	250 U	500 U	250 U	100 U	50.0 U
Methyl tert-butyl ether	395	1,300	2,120	442	240	81.1
Methylene chloride	50.0 U	250 U	500 U	250 U	100 U	50.0 U
Naphthalene	20.0 U	100 U	215	100 U	40.0 U	20.0 U
n-Propylbenzene	148	274	331	175	113	90.0
Styrene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,1,1,2-Tetrachloroethane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,1,2,2-Tetrachloroethane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Tetrachloroethene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Toluene	61.2	62.5	2,320	125	106	50.1
1,2,3-Trichlorobenzene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,2,4-Trichlorobenzene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,1,1-Trichloroethane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,1,2-Trichloroethane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Trichloroethene	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
Trichlorofluoromethane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,2,3-Trichloropropane	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
1,2,4-Trimethylbenzene	10.0 U	50.0 U	1,410	50.0 U	20.0 U	10.0 U
1,3,5-Trimethylbenzene	10.0 U	50.0 U	466	50.0 U	20.0 U	10.0 U
Vinyl chloride	10.0 U	50.0 U	100 U	50.0 U	20.0 U	10.0 U
o-Xylene	10.0 U	50.0 U	842	50.0 U	20.0 U	28.4
m,p-Xylene	54.2	100 U	1,740	100 U	91.4	101

**Notes:**

ug/L = Milligrams per liter

U = Not detected at laboratory reporting limits shown

Volatile Organic Compounds by EPA Method 8260B

GROUNDWATER Oxygenate Data  
Methanol GC (OXY)  
Chevron Willbidge NMS 101001868

Well Location	Sample Identification	Date Sampled	Ethanol (ug/L)	TBA (ug/L)	MTBE (ug/L)	DIPE (ug/L)	ETBE (ug/L)	TAME (ug/L)	Methanol (ug/L)
CR6	CR6	03/30/99	10,000 U	NT	NT	NT	NT	NT	NT
	817CR6-W9	08/17/99	200 U	40 U	2 U	2 U	10 U	10 U	NT
	W-6	09/20/99	200 U	40 U	2 U	2 U	10 U	10 U	NT
	CR6-W12	02/10/00	50 U	6.8	1.0	0.5 U	0.5 U	0.5 U	NT
	CR6	05/16/00	50 U	6.5	1.1	0.5 U	0.5 U	0.5 U	NT
	CR6	04/03/01	50 U	17.0	7.4	0.5 U	0.5 U	0.5 U	NT
	P1G0550-01 (Kiff)	07/17/01	20 U	5.0 U	1.7	0.50 U	0.50 U	0.50 U	100 U
	CR-6	10/23/01	5 U	13.0	3.4	0.50 U	0.50 U	0.50 U	50 U
	CR-6	02/20/02	5 U	5 U	0.9	0.50 U	0.50 U	0.50 U	50 U
CR7	CR7	03/30/99	10,000 U	NT	NT	NT	NT	NT	NT
	817CR7-W10	08/17/99	200 U	40 U	159	2 U	10 U	10 U	NT
	W-7	09/20/99	200 U	40 U	70	2 U	10 U	10 U	NT
	CR7-W13	02/10/00	100 U	70	86	1.7	1 U	2.7	NT
	CR7	05/16/00	50 U	55	110	1.9	2.0	4.1	NT
	CR7	12/14/00	1000 U	100 U	170	10 U	10 U	10 U	NT
	CR7	04/04/01	500 U	110	140	5 U	5 U	14	NT
	P1G0550-03 (Kiff)	07/17/01	10 U	21	76	1.8	1.0 U	3.0	100 U
	CR-7	10/23/01	25 U	19	100	2.6	1.1	4.1	400 U
CR8	CR8	03/30/99	10,000 U	NT	NT	NT	NT	NT	NT
	Not Sampled	08/17/99	NS	NS	NS	NS	NS	NS	NT
	W-8	09/20/99	200 U	40 U	2 U	2 U	10 U	10 U	NT
	CR8-W11	02/10/00	50 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	CR8	05/16/00	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	CR8	12/14/00	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	CR8	04/04/01	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	P1G0550-02 (Kiff)	07/17/01	10 U	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	50 U
	CR-8	10/23/01	5 U	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	50 U
CR10	CR8	02/19/02	5 U	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	50 U
	CR10	03/30/99	10,000 U	NT	NT	NT	NT	NT	NT
	Not Sampled	08/17/99	NSP	NSP	NSP	NSP	NSP	NSP	NT
	CR10-W10	02/10/00	50 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	CR10	05/15/00	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	CR10	12/15/00	100 U	10 U	1.0 U	1.0 U	1.0 U	1.0 U	NT
	CR10	04/05/01	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	P1G0598-05 (Kiff)	07/18/01	10 U	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	50 U
	CR-10	10/24/01	5 U	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	50 U
CR-10	CR-10	02/19/02	5 U	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	50 U

GROUNDWATER - Oxygenate Data  
Methanol GC (OXY)  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Ethanol (ug/L)	TBA (ug/L)	MTBE (ug/L)	DIPE (ug/L)	ETBE (ug/L)	TAME (ug/L)	Methanol (ug/L)
CR12	CMW101-W7	06/09/99	16,100,000	20,000 U	1,000 U	1,000 U	5,000 U	5,000 U	NT
	CMW110-W9 (dup)	06/09/99	20,100,000	20,000 U	1,000 U	1,000 U	5,000 U	5,000 U	NT
	817CR12-W7	08/17/99	200 U	40 U	2 U	2 U	10 U	10 U	NT
	W-12	09/21/99	963,000	20,000 U	1,000 U	1,000 U	5,000 U	5,000 U	NT
	CR12-W7	02/10/00	65,000	100 U	10 U	10 U	10 U	10 U	NT
	CR21-W8 (dup)	02/10/00	70,000	100 U	10 U	10 U	10 U	10 U	NT
	CR12	05/15/00	6,200	200 U	20 U	20 U	20 U	20 U	NT
	CR101A (dup)	05/15/00	6,600	200 U	20 U	20 U	20 U	20 U	NT
	CR12	12/15/00	48,000	200 U	20 U	20 U	20 U	20 U	NT
	CR101A (dup)	12/15/00	53,000	200 U	20 U	20 U	20 U	20 U	NT
	CR12	04/05/01	100,000	100 U	10 U	10 U	10 U	10 U	NT
	CR101A (dup)	04/05/01	100,000	100 U	10 U	10 U	10 U	10 U	NT
	CR12 (Kiff)	08/01/01	20 U	20 U	2.0 U	2.0 U	2.0 U	2.0 U	200 U
	CR12 (Kiff) (dup)	08/01/01	20 U	10 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U
	CR-12	10/24/01	20 U	20 U	2.0 U	2.0 U	2.0 U	2.0 U	1500 U
	CR-101 (dup)	10/24/01	20 U	20 U	2.0 U	2.0 U	2.0 U	2.0 U	1000 U
	CR-12	02/19/02	50 U	50 U	5.0 U	5.0 U	5.0 U	5.0 U	500 U
	CR-101 (dup)	02/19/02	50 U	50 U	5.0 U	5.0 U	5.0 U	5.0 U	500 U
CR13	CMW102-W6	06/09/99	4,740,000	20,000 U	1,000 U	1,000 U	5,000 U	5,000 U	NT
	CR13/W6	08/17/99	10,000 U	2,000 U	100 U	100 U	500 U	500 U	NT
	W-13	09/21/99	5,300,000	20,000 U	1,000 U	1,000 U	5,000 U	5,000 U	NT
	CR13-W6	02/10/00	11,000	100 U	12	10 U	10 U	10 U	NT
	CR13	05/15/00	2,000 U	200 U	20 U	20 U	20 U	20 U	NT
	CR13	12/15/00	9,900	200 U	20 U	20 U	20 U	20 U	NT
	CR13	04/05/01	120,000	200 U	20 U	20 U	20 U	20 U	NT
	P1G0598-04 (Kiff)	07/18/01	20 U	20 U	2.0 U	2.0 U	2.0 U	2.0 U	200 U
	P1G0598-07 (Kiff) (dup)	07/18/01	20 U	20 U	2.0 U	2.0 U	2.0 U	2.0 U	200 U
	CR13 (Kiff)	08/01/01	20 U	10 U	1.8	1.0 U	1.0 U	1.0 U	100 U
	CR-13	10/24/01	20 U	2 U	3.4	2 U	2 U	2 U	200 U
	CR-13	02/19/02	250 U	250 U	25 U	25 U	25 U	25 U	2500 U
CR14	CMW103-W4	06/09/99	11,300	40 U	2 U	2 U	10 U	10 U	NT
	817CR14-W5	08/17/99	200 U	40 U	2 U	2 U	10 U	10 U	NT
	817CR101-W10A (dup)	08/17/99	200 U	40 U	2 U	2 U	10 U	10 U	NT
	W-14	09/21/99	200 U	40 U	2 U	2 U	10 U	10 U	NT
	CR14-W3	02/09/00	50 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	CR14	05/15/00	50 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	CR14	12/15/00	50 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	CR14	04/05/01	1,300	5 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	P1G0598-01 (Kiff)	07/18/01	10 U	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	50 U
	CR14 (Kiff)	08/01/01	20 U	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	100 U
	CR-14	10/24/01	5 U	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	50 U
	CR-14	02/18/02	5 U	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	50 U
CR15	CMW104-W5	06/09/99	200 U	40 U	174	2 U	10 U	10 U	NT
	Not Sampled	08/17/99	NSP	NSP	NSP	NSP	NSP	NSP	NT
	CR15-W5	02/09/00	4,000	100 U	160	10 U	10 U	10 U	NT

GROUNDWATER Oxygenate Data  
Methc 3C (OXY)  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Ethanol (ug/L)	TBA (ug/L)	MTBE (ug/L)	DIPE (ug/L)	ETBE (ug/L)	TAME (ug/L)	Methanol (ug/L)
	CR15	05/15/00	500 U	50 U	150	6.7	5.0 U	5.0 U	NT
	CR15	12/15/00	2000 U	200 U	190	20 U	20 U	20 U	NT
	CR15	04/05/01	2000 U	200 U	130	20 U	20 U	20 U	NT
	P1G0598-03 (Kiff)	07/18/01	500 U	500 U	87	50 U	50 U	50 U	5000 U
	CR-15	10/24/01	250 U	250 U	140	25 U	25 U	25 U	5000 U
	CR-15	02/19/02	200 U	200 U	26	20 U	20 U	20 U	2000 U

GROUNDWATER Oxygenate Data  
Methanol JC (OXY)  
Chevron Willbidge NMS 101001868

Well Location	Sample Identification	Date Sampled	Ethanol (ug/L)	TBA (ug/L)	MTBE (ug/L)	DIPE (ug/L)	ETBE (ug/L)	TAME (ug/L)	Methanol (ug/L)
CR16	CMW106-W1	06/08/99	200 U	40 U	2 U	2 U	10 U	10 U	NT
	816CR16-W2	08/16/99	200 U	40 U	14	2 U	10 U	10 U	NT
	W-15	09/21/99	4,170	40 U	106	14	10 U	10 U	NT
	CR16-W2	02/09/00	50 U	5 U	8.4	0.5 U	0.5 U	0.5 U	NT
	CR16	05/15/00	50 U	11	20	0.7	0.5 U	0.5 U	NT
	CR16	12/15/00	50 U	5.7	20	1.1	0.5 U	0.5 U	NT
	CR16	04/05/01	50 U	16.0	15	0.6	0.5 U	0.5 U	NT
	P1G0550-04 (Kiff)	07/17/01	10 U	5.0 U	35	1.5	0.50 U	0.50 U	50 U
	CR-16	10/24/01	5 U	5.0 U	22	0.8	0.50 U	0.50 U	50 U
	CR-16	02/18/02	5 U	5.0 U	24	0.8	0.50 U	0.50 U	50 U
CR17	CMW107-W2	06/08/99	200 U	40 U	2 U	2 U	10 U	10 U	NT
	816CR17-W1	08/16/99	200 U	40 U	2 U	2 U	10 U	10 U	NT
	CR17-W1	02/09/00	50 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	CR17	05/15/00	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	CR17	12/14/00	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	CR17	04/05/01	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	P1G0550-09 (Kiff)	07/17/01	10 U	5.0 U	1.1	0.50 U	0.50 U	0.50 U	50 U
	CR-17	10/24/01	5 U	5.0 U	13.0	0.50 U	0.50 U	0.50 U	50 U
	CR-17	02/18/02	5 U	5.0 U	8.8	0.50 U	0.50 U	0.50 U	50 U
CR18	CMW108-W3	06/08/99	200 U	40 U	2 U	2 U	10 U	10 U	NT
	816CR18-W3	08/16/99	200 U	40 U	2 U	2 U	10 U	10 U	NT
	Not Sampled	02/09/00	NS	NS	NS	NS	NS	NS	NT
	Not Sampled	05/15/00	NS	NS	NS	NS	NS	NS	NT
	Not Sampled	12/14/00	NS	NS	NS	NS	NS	NS	NT
	Not Sampled	04/05/01	NS	NS	NS	NS	NS	NS	NT
CR19	CMW109-W8	06/08/99	775,000	800 U	40 U	40 U	200 U	200 U	NT
	Not Sampled	08/17/99	NSP	NSP	NSP	NSP	NSP	NSP	NT
	CR19-W9	02/10/00	1,000	50 U	5 U	5 U	5 U	5 U	NT
	CR19	05/16/00	120,000	500 U	65	50 U	50 U	50 U	NT
	CR19	12/15/00	2,600	200 U	61	20 U	20 U	20 U	NT
	CR19	04/05/01	500 U	50	41	5 U	5 U	5 U	NT
	P1G0598-06 (Kiff)	07/18/01	25 U	25 U	33	2.5 U	2.5 U	2.5 U	250 U
	CR-19	10/24/01	20 U	20 U	18	2 U	2 U	2 U	200 U
	CR-19	02/20/02	5 U	5 U	4.7	0.50 U	0.50 U	0.50 U	50 U
CR19 (FREE-PHASE PRODUCT)	CR19/Product	07/08/99	100 U	50 U	50 U	50 U	500 U	500 U	NT
	0210CR PRODUCT	02/10/00	100 U	50 U	50 U	50 U	50 U	50 U	NT
CR20	CR20/W20	07/08/99	200 U	40 U	64	2 U	10 U	10 U	NT
	817CR20-W4	08/17/99	200 U	40 U	82	2 U	10 U	10 U	NT
	CR20-W4	02/09/00	500 U	50 U	21	5 U	5 U	5 U	NT

GROUNDWATER Oxygenate Data  
Methc GC (OXY)  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Ethanol (ug/L)	TBA (ug/L)	MTBE (ug/L)	DIPE (ug/L)	ETBE (ug/L)	TAME (ug/L)	Methanol (ug/L)
	CR20	05/15/00	500 U	50 U	13	5.0 U	5.0 U	5.0 U	NT
	CR20	12/15/00	500 U	50 U	11	5.0 U	5.0 U	5.0 U	NT
	CR20	04/05/01	500 U	17	16	5.0 U	5.0 U	5.0 U	NT
	P1G0598-02 (Kiff)	07/18/01	50 U	50 U	15	5.0 U	5.0 U	5.0 U	500 U
	CR-20	10/24/01	50 U	5 U	12	5.0 U	5.0 U	5.0 U	500 U
	CR-20	02/18/02	50 U	50 U	11	5.0 U	5.0 U	5.0 U	500 U



GROUNDWATER - Oxygenate Data  
Methanol 3C (OXY)  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Ethanol (ug/L)	TBA (ug/L)	MTBE (ug/L)	DIPE (ug/L)	ETBE (ug/L)	TAME (ug/L)	Methanol (ug/L)
CR21A	21A	12/14/00	5000 U	500 U	100	50 U	50 U	50 U	NT
	CR21A	04/04/01	2000 U	200 U	48	20 U	20 U	20 U	NT
	P1G0550-05 (Kiff)	07/17/01	100 U	50 U	39	5.0 U	5.0 U	5.0 U	500 U
	CR-21A	10/23/01	25 U	25 U	47	2.9	2.5 U	2.5 U	500 U
	CR-21A	02/19/02	50 U	50 U	77	5.0 U	5.0 U	5.0 U	500 U
CR21B	21B	12/14/00	50 U	5.0 U	0.5 U	15	0.5 U	0.5 U	NT
	CR21B	04/04/01	50 U	5.0 U	0.5 U	17	0.5 U	0.5 U	NT
	P1G0500-08 (Kiff)	07/16/01	5.0 U	5.0 U	0.50 U	17	0.50 U	0.50 U	50 U
	CR-21B	10/23/01	5.0 U	5.0 U	0.50 U	19	0.50 U	0.50 U	50 U
	CR-21B	02/19/02	5.0 U	5.0 U	0.50 U	19	0.50 U	0.50 U	50 U
CR22A	22A	12/13/00	2000 U	200 U	83	20 U	20 U	20 U	NT
	CR22A	04/03/01	500 U	50 U	46	5 U	5 U	5 U	NT
	P1G0500-03 (Kiff)	07/16/01	20 U	20 U	57	2.0 U	2.0 U	2.0 U	200 U
	CR-22A	10/22/01	50 U	20 U	34	2.0 U	2.0 U	2.0 U	200 U
	CR-22A	02/20/02	50 U	20 U	52	2.0 U	2.0 U	2.0 U	500 U
CR22B	22B	12/13/00	50 U	5.0 U	3.4	0.5 U	0.5 U	0.5 U	NT
	CR22B	04/03/01	50 U	11	3.0	0.5 U	0.5 U	0.5 U	NT
	P1G0500-04 (Kiff)	07/16/01	5.0 U	8.9	0.50 U	0.50 U	0.50 U	0.50 U	50 U
	CR-22B	10/22/01	5.0 U	6.4	0.50 U	0.51	0.50 U	0.50 U	50 U
	CR-22B	02/20/02	5.0 U	5.4	0.50 U	0.50 U	0.50 U	0.50 U	50 U
CR23A	23A	12/13/00	50 U	32	77	3.5	0.5 U	0.5 U	NT
	CR23A	04/04/01	200 U	20 U	6.1	2.0 U	2.0 U	2.0 U	NT
	P1G0500-05 (Kiff)	07/16/01	10 U	34	4.1	0.50 U	0.50 U	0.50 U	50 U
	CR-23A	10/23/01	5 U	37	9.6	0.50 U	0.50 U	0.50 U	50 U
	CR-23A	02/20/02	5 U	27	6.0	0.50 U	0.50 U	0.50 U	50 U
CR23B	23B	12/13/00	50 U	9.1	53	2.2	0.5 U	0.5 U	NT
	CR23B	04/03/01	50 U	8.2	11	0.5	0.5 U	0.5 U	NT
	P1G0500-01 (Kiff)	07/16/01	25 U	25 U	25	2.5 U	2.5 U	2.5 U	250 U
	CR-23B	10/23/01	5 U	5 U	12	0.6	0.5 U	0.5 U	50 U
	CR-23B	02/20/02	20 U	20 U	14	2.0 U	2.0 U	2.0 U	200 U
CR24A	24A	12/15/00	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	CR24A	04/05/01	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U	NT
	P1G0550-10 (Kiff)	07/17/01	8.7	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	61
	CR-24A	10/24/01	5.0 U	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	50 U
	CR-24A	02/20/02	5.0 U	5.0 U	0.50 U	0.50 U	0.50 U	0.50 U	50 U
CR24B	24B	12/12/00	50 U	5.0 U	0.5 U	1.2	0.5 U	0.5 U	NT
	CR24B	04/03/01	50 U	5.0 U	0.5 U	1.5	0.5 U	0.5 U	NT
	P1G0500-02 (Kiff)	07/16/01	5.0 U	5.0 U	0.50 U	1.6	0.50 U	0.50 U	50 U
	CR-24B	10/23/01	5.0 U	5.0 U	0.50 U	2.0	0.50 U	0.50 U	50 U
	CR-24B	02/20/02	5.0 U	5.0 U	0.50 U	1.4	0.50 U	0.50 U	50 U

GROUNDWATER Oxygenate Data  
Method: GC (OXY)  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Ethanol (ug/L)	TBA (ug/L)	MTBE (ug/L)	DIPE (ug/L)	ETBE (ug/L)	TAME (ug/L)	Methanol (ug/L)
CR25	25	12/13/00	200 U	20 U	2.8	21	2 U	2 U	NT
	CR25	04/05/01	500 U	50 U	5.0 U	5.0 U	5.0 U	5.0 U	NT
	P1G0550-08 (Kiff)	07/17/01	20 U	10 U	6.4	1.0 U	1.0 U	1.0 U	100 U
	CR-25	10/23/01	5 U	7.7	3.7	0.5 U	0.5 U	0.5 U	50 U
	CR-25	02/19/02	5 U	11.0	10.0	0.5 U	0.5 U	0.5 U	50 U
GPW1	GP1	12/13/00	5000 U	500 U	450	50 U	50 U	50 U	NT
	GPW-1	04/04/01	500 U	1,100	470	5.0 U	5.0 U	27	NT
	P1G0500-06 (Kiff)	07/16/01	50 U	58	420	5.0 U	5.0 U	16	500 U
	GPW-1	10/22/01	50 U	50 U	340	5.3	5.0 U	11	1500 U
	GPW-1	02/18/02	25 U	71	170	2.5 U	2.5 U	12	250 U
GPW3	GP3	12/13/00	5000 U	500 U	2,100	50 U	50 U	50 U	NT
	GPW-3	04/04/01	5000 U	3,900	2,200	50 U	50 U	50 U	NT
	P1G0500-07 (Kiff)	07/16/01	500 U	500 U	2,000	50 U	50 U	50 U	5000 U
	GPW-3	10/23/01	200 U	200 U	1,100	20 U	20 U	25	6000 U
	GPW-3	02/19/02	500 U	500 U	2,000	50 U	50 U	50 U	5000 U

GROUNDWATER - Oxygenate Data  
Methanol (OXY)  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Ethanol (ug/L)	TBA (ug/L)	MTBE (ug/L)	DIPE (ug/L)	ETBE (ug/L)	TAME (ug/L)	Methanol (ug/L)
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**Notes:**

ug/L = Micrograms per Liter

U = Undetected above laboratory detection limit shown

ND = Analyte not detected in the sample

NT = Not tested

NA= Not available

NS = Not sampled

NSP = Not sampled due to presence of free-phase product

MTBE=Methyl tert-Butyl Ether

DIPE=Di-isopropyl Ether

ETBE=Ethyl tert-Butyl Ether

TAME=tert-Amyl Methyl Ether

TBA = tert-Butanol (t-Butyl Alcohol)

GROUNDWATER - BTEX  
Method: EPA 602/8020  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total BTEX (ug/L)
CR6	CR6	03/30/99	2.93	1.34	1.00 U	3.00 U	6
	817CR6-W9	08/17/99	0.7	0.5 U	0.5 U	0.5 U	1.5
	W-6	09/20/99	1.2	0.5 U	0.5 U	0.5 U	2.0
	CR6-W12	02/10/00	0.6	0.5 U	0.5 U	0.5 U	1.4
	CR6	05/16/00	0.6	0.5 U	0.5 U	0.5 U	1.4
	CR6	04/03/01	0.6	0.5 U	0.5 U	0.5 U	1.4
	P1G0550-01 (Kiff)	07/17/01	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	CR-6	10/23/01	0.5 U	0.5 U	0.5 U	0.70	2 U
	CR-6	02/20/02	1.9	0.5 U	0.5 U	0.75	3
CR7	CR7	03/30/99	102	6.34	4.91	3.00 U	115
	817CR7-W10	08/17/99	1,500	140	31	28	1,699
	W-7	09/20/99	440	11	0.5 U	7	458
	CR7-W13	02/10/00	850	27	26	9.6	913
	CR7	05/16/00	1,000	25	25	9.5	1,060
	CR7	12/14/00	1,200	27	20	24.0	1,271
	CR7	04/04/01	990	17	15	9.7	1,032
	P1G0550-03 (Kiff)	07/17/01	540	6	5	6.5	557
	CR-7	10/23/01	770	13	7	17	807
	CR-7	02/20/02	950	11	11	21	993
CR8	CR8	03/30/99	1.00 U	1.00 U	1.00 U	3.00 U	6.00 U
	Not Sampled	08/17/99	NS	NS	NS	NS	NS
	W-8	09/20/99	0.6	0.5 U	0.5 U	0.5 U	1.4
	CR8-W11	02/10/00	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	CR8	05/16/00	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	CR8	12/14/00	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	CR8	04/04/01	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	P1G0550-02 (Kiff)	07/17/01	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	CR-8	10/23/01	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	CR-8	02/19/02	0.5 U	0.5 U	0.5 U	0.5 U	2 U
CR10	CR10	03/30/99	89.9	7.96	1.00 U	6.76 U	102
	Not Sampled	08/17/99	NSP	NSP	NSP	NSP	NSP
	W-10	09/20/99	40.0	3.0	0.5 U	4.1	47
	CR10-W10	02/10/00	60	6.0	1.0	5.7	73
	CR10	05/15/00	53	4.9	0.6	4.0	63
	CR10	12/15/00	130	17.0	1.7	12.0	161
	CR10	04/05/01	7	3.9	0.6	3.0	14
	P1G0598-05 (Kiff)	07/18/01	43	5.8	0.60	4.3	54
	CR-10	10/24/01	170	7.8	0.83	4.7	183
	CR-10	02/19/02	80	7.6	0.96	6.4	95

GROUN TER - BTEX  
Method: EPA 602/8020  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total BTEX (ug/L)
CR12	CMW101-W7	06/09/99	1,500	6,090	768	5,070	13,428
	CMW110-W9 (dup)	06/09/99	1,530	6,290	760	5,220	13,800
	817CR12-W7	08/17/99	210	1,700	180	1,100	3,190
	W-12	09/21/99	300	2,100	270	1,700	4,370
	CR12-W7	02/10/00	280	19,000	4,500	31,000	54,780
	CR21-W8 (dup)	02/10/00	270	20,000	4,800	33,000	58,070
	CR12	05/15/00	210	11,000	3,600	29,000	43,810
	CR101A (dup)	05/15/00	270	9,500	3,800	31,000	44,570
	CR12	12/15/00	150	2,700	580	3,500	6,930
	CR101A (dup)	12/15/00	160	2,900	710	4,000	7,770
	CR12	04/05/01	24	970	260	1,600	2,854
	CR101A (dup)	04/05/01	32	950	270	1,600	2,852
	CR12 (Kiff)	08/01/01	6.4	320	99	630	1,055
	CR12 (Kiff) (dup)	08/01/01	6.7	300	100	630	1,037
	CR-12	10/24/01	15.0	560	170	900	1,645
	CR-101 (DUP)	10/24/01	13.0	520	160	840	1,533
	CR-12	02/19/02	5 U	270	360	3,300	3,930
	CR-101 (DUP)	02/19/02	5 U	300	380	3,500	4,180
CR13	CMW102-W6	06/09/99	604	2,970	1,090	4,990	9,654
	817CR13-W6	08/17/99	280	800	360	1,600	3,040
	W-13	09/21/99	980	2,200	740	3,000	6,920
	CR13-W6	02/10/00	2,200	5,300	1,800	4,900	14,200
	CR13	05/15/00	810	2,000	1,800	5,400	10,010
	CR13	12/15/00	2,300	18,000	1,700	9,300	31,300
	CR13	04/05/01	450	2,000	520	2,300	5,270
	P1G0598-04 (Kiff)	07/18/01	120	330	250	1,200	1,900
	P1G0598-07 (Kiff) (dup)	07/18/01	130	370	280	1,200	1,980
	CR-13	10/24/01	420	540	460	1,900	3,320
	CR-13	02/19/02	250	6,000	1,200	4,800	12,250
CR14	CMW103-W4	06/09/99	9.0	2 U	2 U	2 U	12
	817CR14-W5	08/17/99	5.4	0.5 U	0.5 U	0.5 U	6.2
	817CR101-W10A (dup)	08/17/99	3.4	0.5 U	0.5 U	0.5 U	4.2
	W-14	09/21/99	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	CR14-W3	02/09/00	230	47	3.4	12	292
	CR14	05/15/00	21	4.5	0.5 U	1.7	27
	CR14	12/15/00	1.6	0.5 U	0.5 U	0.5 U	3.1 U
	CR14	04/05/01	19.0	2.8	0.6	2.9	25
	P1G0598-01 (Kiff)	07/18/01	24	1.4	0.57	2.0	28
	CR-14	10/24/01	32	1.6	0.5 U	1.6	35
	CR-14	02/18/02	86	8.1	2.5	7.2	104
CR15	CMW104-W5	06/09/99	20,900	1,450	1,080	4,760	28,190
	Not Sampled	08/17/99	NSP	NSP	NSP	NSP	NSP
	W-15	09/21/99	15,000	150	1.0U	1,500	16,650

GROUP WATER - BTEX  
Method: EPA 602/8020  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total BTEX (ug/L)
	CR15-W5	02/09/00	11,000	570	610	2,700	14,880
	CR15	05/16/00	8,600	840	600	2,500	12,540
	CR15	12/15/00	13,000	70	540	1,800	15,410
	CR15	04/05/01	14,000	25	360	1,200	15,585
	P1G0598-03 (Kiff)	07/18/01	12,000	50 U	350	1,100	13,475
	CR-15	10/24/01	10,000	25 U	200	520	10,745
	CR-15	02/19/02	3,600	20 U	670	1,800	6,095

GROUP WATER - BTEX  
Method: EPA 602/8020  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total BTEX (ug/L)
CR16	CMW106-W1	06/08/99	11	2 U	2 U	2 U	14
	816CR16-W2	08/16/99	7.6	0.5 U	0.5 U	0.5 U	8.4
	W-16	09/21/99	1.7	0.5 U	0.5 U	0.5 U	2.5
	CR16-W2	02/09/00	2.2	0.5 U	0.5 U	0.5 U	3.0
	CR16	05/15/00	1.3	0.90	0.5 U	2.6	5.1
	CR16	12/15/00	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	CR16	04/05/01	1	0.5 U	0.5 U	0.5 U	2.0
	P1G0550-04 (Kiff)	07/17/01	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	CR-16	10/24/01	0.5 U	0.52	0.5 U	0.5 U	2 U
	CR-16	02/18/02	0.5 U	0.5 U	0.5 U	0.5 U	2 U
CR17	CMW107-W2	06/08/99	2 U	2 U	2 U	2 U	8 U
	816CR17-W1	08/16/99	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	W-17	09/21/99	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	CR17-W1	02/09/00	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	CR17	05/15/00	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	CR17	12/14/00	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	CR17	04/05/01	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	P1G0550-09 (Kiff)	07/17/01	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	CR-17	10/24/01	1.6	0.5 U	0.5 U	0.5 U	3 U
	CR-17	02/18/02	31	3	0.5 U	0.5 U	34
CR18	CMW108-W3	06/08/99	2 U	2 U	2 U	2 U	8 U
	816CR18-W3	08/16/99	0.5 U	0.5 U	0.5 U	0.5 U	2 U
	Not Sampled	02/09/00	NS	NS	NS	NS	NS
	Not Sampled	05/15/00	NS	NS	NS	NS	NS
	Not Sampled	02/18/02	NS	NS	NS	NS	NS
CR19	CMW109-W8	06/08/99	2,430	661	150	654	3,895
	-	08/17/99	NSP	NSP	NSP	NSP	NSP
	CR19-W9	02/10/00	320	1,700	120	560	2,700
	CR19	05/16/00	520	750	220	1,300	2,790
	CR19	12/15/00	1,100	220	73	310	1,703
	CR19	04/05/01	700	76	37	140	953
	P1G0598-06 (Kiff)	07/18/01	720	42	26	95	883
	CR-19	10/24/01	390	17	10	47	464
	CR-19	02/20/02	120	25	110	330	585
CR19 (FREE-PHASE PRODUCT)	CR19/PRODUCT	07/08/99	999	767.0	462	938	3,166
	0210CR PRODUCT	02/10/00	96	1,300.0	270	1,200	2,866

GROUNDWATER - BTEX  
Method: EPA 602/8020  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total BTEX (ug/L)
CR20	CR20/W20	07/08/99	6,240	100	389	1,090	7,819
	817CR20/W4	08/17/99	3,300	12	290	770	4,372
	W-20	09/21/99	2,300	4.4	1U	540	2,844
	CR20-W4	02/09/00	2,900	60	350	880	4,190
	CR20	05/15/00	2,400	40	270	720	3,430
	CR20	12/15/00	1,600	5.4	110	280	1,995
	CR20	04/05/01	1,500	5.8	110	210	1,826
	P1G0598-02 (Kiff)	07/18/01	1,300	5.0 U	110	130	1,543
	CR-20	10/24/01	1,100	5.6	53	21	1,177
	CR-20	02/18/02	1,900	11.0	150	150	2,203
CR21A	21A	12/14/00	1,700	460	210	760	3,130
	CR21A	04/04/01	1,300	130	130	310	1,870
	P1G0550-05 (Kiff)	07/17/01	910	130	200	530	1,770
	CR-21A	10/23/01	720	72	99	230	1,121
	CR-21A	02/19/02	1,000	91	110	280	1,481
CR21B	21B	12/14/00	3	1	0.5 U	13	17
	CR21B	04/04/01	0.5 U	0.5 U	0.5 U	0.5 U	2.0 U
	P1G0500-08 (Kiff)	07/16/01	0.50	1.3	0.50 U	0.50 U	2.3
	CR-21B	10/23/01	0.50	0.72	0.50 U	4.2	1.7
	CR-21B	02/19/02	0.5 U	0.5 U	0.5 U	0.5 U	2.0 U
CR22A	22A	12/13/00	860	25	24	88	997
	CR22A	04/03/01	230	11	8	26	275
	P1G0500-03 (Kiff)	07/16/01	310	13	12	34	369
	CR-22A	10/22/01	250	8.9	6.6	23	32.4
	CR-22A	02/20/02	180	9.4	3.9	15	24.9
CR22B	22B	12/13/00	66	0.5 U	0.5 U	59	126
	CR22B	04/03/01	170	0.5 U	0.5 U	0.5 U	171
	P1G0500-04 (Kiff)	07/16/01	0.50 U	0.66	0.50 U	0.58	1.7
	CR-22B	10/22/01	0.50 U	1.0U	0.50 U	2.0U	4.0U
	CR-22B	02/20/02	0.50 U	0.50 U	0.50 U	0.50 U	2.0U
CR23A	23A	12/13/00	700	0.8	22	18	741
	CR23A	04/04/01	54	2 U	7.4	2.1	64
	P1G0500-05 (Kiff)	07/16/01	33	1.1	6.2	2.4	43
	CR23-A	10/23/01	34	0.91	3.5	2.3	41
	CR23-A	02/20/02	28	0.5 U	5.6	1.6	35
CR23B	23B	12/13/00	770	78	14	10	872
	CR23B	04/03/01	240	27	3.7	3.7	274
	P1G0500-01 (Kiff)	07/16/01	550	87	4.1	13	654
	CR-23B	10/23/01	240	15	3.3	7.7	266



GROUNDWATER - BTEX  
Method: EPA 802/8020  
Chevron Willbidge NMS 101001868

Well Location	Sample Identification	Date Sampled	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total BTEX (ug/L)
	CR-23B	02/20/02	380	13	6.7	15	415
CR24A	24A	12/15/00	0.5 U	1.5	0.5 U	1.6	3.1 U
	CR24A	04/05/01	0.5 U	1.1	0.5 U	1.7	2.8 U
	P1G0550-10 (Kiff)	07/17/01	0.5 U	0.69	0.5 U	0.59	1.8
	CR-24A	10/24/01	0.5 U	0.54	0.5 U	0.5 U	2 U
	CR-24A	02/20/02	0.5 U	0.74	1	1	2
CR24B	24B	12/12/00	14	0.5 U	0.5 U	0.5 U	15.5 U
	CR24B	04/03/01	1.5	0.5 U	0.5 U	0.5 U	3.5 U
	P1G0500-02 (Kiff)	07/16/01	13	0.50 U	0.50 U	0.50 U	14
	CR-24B	10/23/01	16	0.50 U	0.50 U	0.50 U	16
	CR-24B	02/20/02	11	0.50 U	0.50 U	0.50 U	11

GROUNDWATER - BTEX  
Method: L A 602/8020  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Total BTEX (ug/L)
CR25	25	12/13/00	51	59	3.2	23	136
	CR25	04/05/01	97	56	55	530	738
	P1G0550-08 (Kiff)	07/17/01	16	74	40	390	520
	CR-25	10/23/01	5.7	52	30	340	428
	CR-25	02/19/02	7	54	31	380	472
GPW1	GP1	12/13/00	2,100	63	150	50 U	2,363
	GPW-1	04/04/01	1,200	27	27	12	1,266
	P1G0500-06 (Kiff)	07/16/01	1,100	27	44	23	1,194
	GPW-1	10/22/01	1,300	26	31	12	1,369
	GPW-1	02/19/02	690	7	29	3	729
GPW3	GP3	12/13/00	13,000	690	1,200	1,300	16,190
	GPW-3	04/04/01	14,000	100	890	580	15,570
	P1G0500-07 (Kiff)	07/16/01	12,000	81	620	350	13,051
	GPW-3	10/23/01	4,600	30	250	100	4,980
	GPW-3	02/19/02	11,000	57	640	220	11,917
NA	TRIP BLANK	02/09/00	0.5 U	0.5 U	0.5 U	0.5 U	2 U

**Notes:**

ug/L = Micrograms per Liter

U = Undetected above laboratory reporting limit shown

ND = Analyte not detected in the sample

NA= Not available

NS = Not sampled

NSP = Not sampled due to presence of free-phase product

WA = Well abandoned

*Results in italics indicate that analysis was performed using EPA Method 8260B*

SOIL - BTEX  
Method: EPA 602/8020

Well Location	Sample Depth	Sample Identification	Date Sampled	Benzene (ug/Kg)	Toluene (ug/Kg)	Ethylbenzene (ug/Kg)	Total Xylenes (ug/Kg)	Total BTEX (ug/Kg)
CR12	5 feet	MW-1/S1/5'	06/01/99	605	13,000	6,550	48,100	68,255
CR12	10 feet	MW-1/S2/10'	06/01/99	50U	550	493	2,480	<3,573
CR13	5 feet	MW-2/S4/5'	06/01/99	20U	133	1,240	5,580	<6,973
CR14	5 feet	MW-3/S10/5'	06/01/99	155	321	96	402	974
CR15	10 feet	MW-4/S8/10'	06/01/99	8,450	357	1,290	5,120	15,217
CR15	15 feet	MW-4/S9/15'	06/01/99	3,190	1,260	259	1,150	5,859
CR16	10 feet	MW-6/S20/10'	06/02/99	20U	20U	20U	20U	<80
CR16	15 feet	MW-6/S21/15'	06/02/99	2U	5.8	2U	12	<21.8
CR17	5 feet	MW-7/S16/5'	06/02/99	100U	100U	3,270	17,000	<20,470
CR18	5 feet	MW-8/S22/5'	06/02/99	2U	2U	2U	2U	<8
CR19	5 feet	MW-9/S13/5'	06/02/99	250U	687	6,440	27,000	<34,377
CR19	15 feet	MW-9/S15/15'	06/02/99	4.6	2.6	2U	7.5	<16.7

**Notes:**

ug/Kg = Micrograms per Kilogram

U = Undetected above detection limit shown

ND = Analyte not detected in the sample

NA= Not available

NS = Not sampled

WA = Well abandoned

- = Cleanup levels have not been assigned

Aromatic volatiles by XXXXXXXXX

GROUNDWATER - Secondary Constituents  
Chevron Willi NMS 101001868

Well Location	Date Sampled	Sample Identification	Dissolved Manganese (1) (mg/L)	Sulfide (2) (mg/L)	Total Alkalinity (3) (mg/L)	Total Organic Carbon (4) (mg/L)	Carbon Dioxide (5) (mg/L)	Nitrate-Nitrogen (6) (mg/L)	Nitrite-Nitrogen (6) (mg/L)	Sulfate (6) (mg/L)	Methane (7) (ug/L)	d <sup>13</sup> C DIC (8) (‰)	Acetone (9) (ug/L)	Phosphorus (10) (mg/L)
CR6	05/16/00	CR6	2.61	1.00 U	388	15.3	193	0.100 U	0.100 U	1.00 U	8170	-3.06	-	-
	08/15/00	CR6	6.10	5.00 U	585	36.0	220	0.100 U	0.100 U	1.00 U	5820	-	-	-
	12/14/00	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS
CR7	05/16/00	CR7	18.3	3.28	548	34.9	242	0.808	0.280	1.00 U	9580	3.55	-	-
	08/15/00	CR7	18.9	5.00 U	445	13.4	235	0.100 U	0.100 U	1.00 U	7280	-	-	-
	12/14/00	CR7	20.9	2.56	647	62.4	209	0.100 U	0.118	1.78	7470	-	50 U	0.06
CR8	05/16/00	CR8	0.306	1.00 U	170	3.00 U	32.6	0.100 U	0.100 U	23.4	36.9	-21.61	-	-
	08/15/00	CR8	0.450	5.00 U	169	3.00 U	29.2	0.100 U	0.100 U	16.7	90.0	-	-	-
	12/14/00	CR8	1.170	2.96	161	1.18	36	0.100 U	0.100 U	23.4	824.0	-	10 U	0.76
CR10	05/15/00	CR10	2.10	1.00 U	124	24.2	73.8	0.100 U	0.100 U	1.00 U	6730	-11.76	-	-
	08/15/00	CR10	3.00	5.00 U	179	14.0	120	0.100 U	0.100 U	1.00 U	6210	-	-	-
	12/15/00	CR10	3.21	1.00 U	199	15.7	152	0.100 U	0.100 U	1.00 U	6110	-	35 U	0.01
CR12	05/15/00	CR12	2.81	1.00 U	112	45.5	175	0.100 U	0.100 U	3.21	506	-23.17	-	-
	05/15/00	CR101A (duplicate)	2.70	1.68	126	35.3	154	0.100 U	0.100 U	3.45	741	-22.42	-	-
	08/14/00	CR12	0.951	5.00 U	51.0	3.00 U	30.0	0.100 U	0.124	1.00 U	4530	-	-	-
	08/14/00	CR101A (duplicate)	0.932	5.00 U	46.0	3.00 U	30.9	0.100 U	0.119	1.00 U	2840	-	-	-
	12/15/00	CR12	4.620	1.00 U	245.0	207	141	0.100 U	0.100 U	1.00 U	6530	-	200 U	0.06
	12/15/00	CR101A (duplicate)	4.990	1.00 U	227.0	193	76.1	0.100 U	0.100 U	1.00 U	5800	-	200 U	0.35
CR13	05/15/00	CR13	2.42	1.60	104	16.8	42.9	0.100 U	0.100 U	1.00 U	4740	-26.23	-	-
	08/14/00	CR13	1.97	5.00 U	48.0	4.81	75.5	0.100 U	0.100 U	1.00 U	5520	-	-	-
	12/15/00	CR13	4.71	1.00 U	193.0	66.7	196	0.100 U	0.154	1.00 U	6610	-	1000 U	0.02
CR14	05/15/00	CR14	0.922	1.60	54.0	3.00 U	32.6	0.100 U	0.100 U	1.00 U	1270	-20.28	-	-
	08/15/00	CR14	0.777	5.00 U	88.0	3.00 U	26.6	0.100 U	0.100 U	1.00 U	2980	-	-	-
	12/15/00	CR14	1.02	1.00 U	57.5	1.65	32.6	0.100 U	0.100 U	1.00 U	4120	-	50 U	0.80
CR15	05/16/00	CR15	16.3	1.00 U	296	40.4	345	0.100 U	0.130	1.00 U	10600	-3.83	-	-
	08/14/00	CR15	17.6	5.00 U	603	8.64	354	0.100 U	0.100 U	1.00 U	8140	-	-	-
	12/15/00	CR15	12.5	2.88	446	9.71	355	0.100 U	0.100 U	1.00 U	4830	-	1000 U	2.21
CR16	05/15/00	CR16	7.49	1.00 U	448	15.0 U	189	0.100 U	0.100 U	1.00 U	227	-6.27	-	-
	08/14/00	CR16	6.02	5.00 U	475	18.8	196	0.100 U	0.100 U	1.00 U	4110	-	-	-
	12/15/00	CR16	10.5	1.00U	405	15.7	133	0.100 U	0.100 U	1.00 U	1200	-	10 U	0.04
CR17	05/15/00	CR17	2.54	1.00 U	78.0	15.0 U	42	0.100 U	0.100 U	1.00 U	2200	-18.41	-	-
	08/14/00	CR17	2.05	5.00 U	77.0	4.05	40.0	0.100 U	0.136	1.00 U	3840	-	-	-
	12/15/00	CR17	2.04	1.00 U	65.7	3.59	39.1	0.100 U	0.100 U	1.00 U	3920	-	10 U	0.45
CR18	05/15/00	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	-
	08/15/00	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	-
	12/15/00	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CR19	05/16/00	CR19	10.2	8.88	396	320	223	0.100 U	0.100 U	1.00 U	2240	-5.68	-	-
	08/14/00	CR19	13.3	5.00 U	505	137	280	0.100 U	0.100 U	1.00 U	10100	-	-	-
	12/15/00	CR19	12.5	1.00 U	419	50.8	215	0.100 U	0.146	1.00 U	7560	-	50 U	0.0100 U

GROUNDWATER --Secondary Constituents  
Chevron Willi NMS 101001868

Well Location	Date Sampled	Sample Identification	Dissolved Manganese (1) (mg/L)	Sulfide (2) (mg/L)	Total Alkalinity (3) (mg/L)	Total Organic Carbon (4) (mg/L)	Carbon Dioxide (5) (mg/L)	Nitrate-Nitrogen (6) (mg/L)	Nitrite-Nitrogen (6) (mg/L)	Sulfate (6) (mg/L)	Methane (7) (ug/L)	d <sup>13</sup> C DIC (8) (‰)	Acetone (9) (ug/L)	Phosphorus (10) (mg/L)
CR20	05/15/00	CR20	2.34	1.00 U	80.0	7.53	60.4	0.100 U	0.100 U	1.00 U	5290	-9.99	-	-
	08/14/00	CR20	2.52	5.00 U	68.0	3.82	61.5	0.100 U	0.100 U	1.00 U	3560	-	-	-
	12/15/00	CR20	2.79	1.00 U	77.9	3.28	65.3	0.100 U	0.100 U	1.00 U	5720	-	100 U	0.19
CR21A	12/14/00	21A	7.66	1.00 U	351.0	17.7	93.1	0.100 U	0.100 U	1.00 U	2020	-	100 U	0.0120
CR21B	12/14/00	21B	1.25	1.76	321.0	2.05	117	0.100 U	0.100 U	3.58	54.2	-	10 U	0.0275
CR22A	12/13/00	22A	17.4	1.00 U	417.0	9.73	87.3	0.100 U	0.100 U	1.00 U	5150	-	50 U	54.1
CR22B	12/13/00	22B	0.802	4.16	222.0	1.16	39.4	0.100 U	0.100 U	5.36	57.2	-	10 U	0.2170
CR23A	12/13/00	23A	5.9	3.68	513.0	42.5	204	0.100 U	0.100 U	2.1	4870	-	50 U	0.1650
CR23B	12/13/00	23B	3.86	4.24	480.0	125	230	0.100 U	0.29	1.00 U	6430	-	50 U	0.0925
CR24A	12/13/00	24A	5.27	6.16	446.0	30.2	162	0.100 U	0.100 U	2.97	2160	-	10 U	0.0167
CR24B	12/12/00	24B	1.46	1.04	397	3.54	117	0.100 U	0.100 U	1.00 U	100	-	10 U	0.2330
CR25	12/13/00	25	6.39	1.00 U	375	8.6	84	0.100 U	0.100 U	2.22	4040	-	10 U	0.0420
GPW1	12/13/00	GP1	34.3	1.00 U	684	177	335	0.100 U	0.276	1.00 U	5640	-	100 U	0.0200
GPW3	12/13/00	GP3	20	1.00 U	438	23.2	191	0.100 U	0.100 U	1.24	3740	-	1000 U	0.0350 U

ug/L = Micrograms per Liter

mg/L = Milligrams per Liter

U = Undetected at or above laboratory reporting limit shown

ND = Analyte not detected in the sample

NT = Not tested

NS = Not sampled

"-" = Analytical data not provided to PNG

NSP = Not sampled due to presence of free-phase product

(1) Dissolved Manganese by EPA Method 200.7

(2) Sulfide by EPA Method 9030-Modified

(3) Total Alkalinity by EPA Method 310.1

(4) Total Organic Carbon by EPA Method 415.1

(5) Carbon Dioxide by Standard Method 4500-C

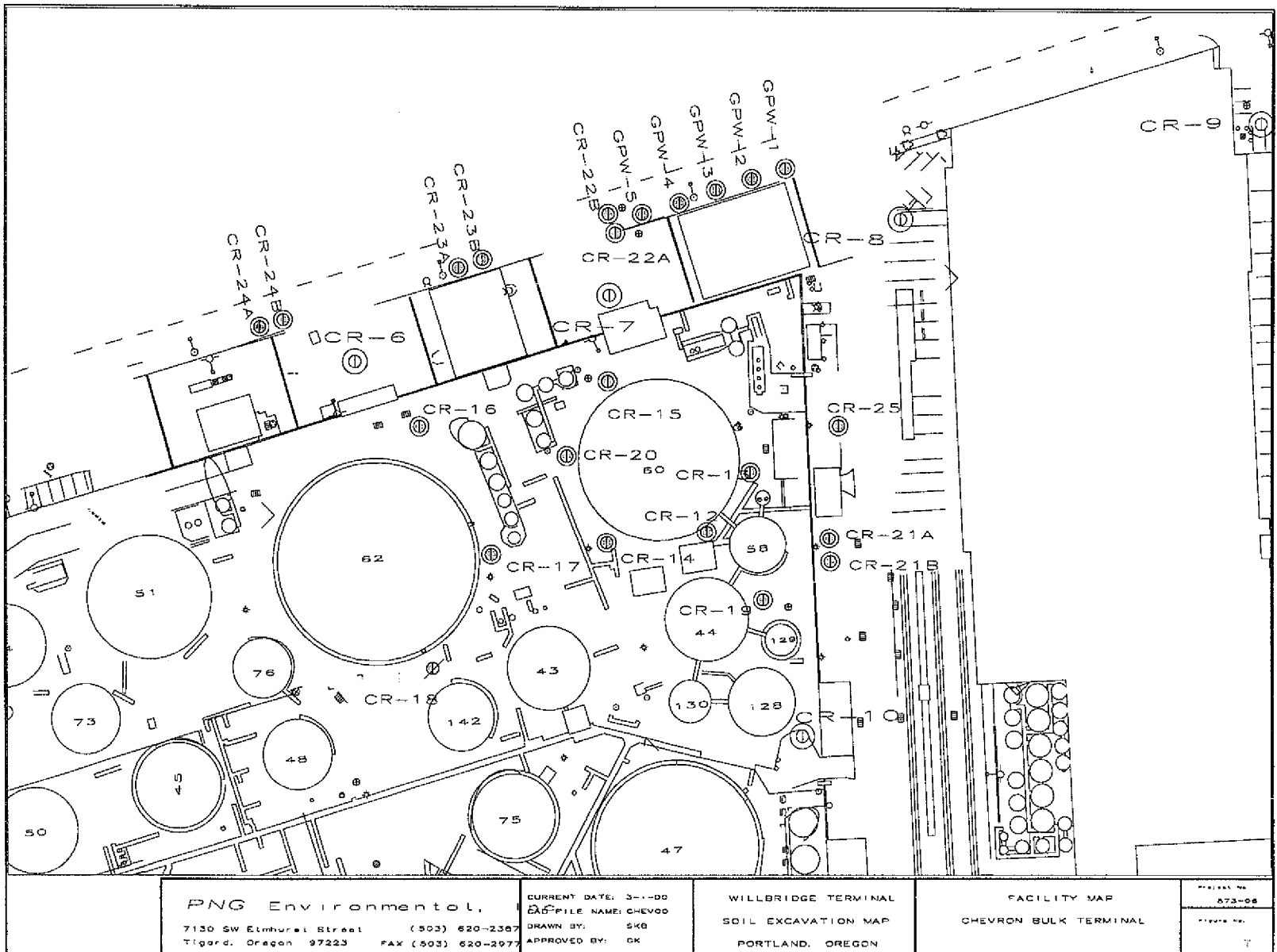
(6) Nitrate, Nitrite, and Sulfate by EPA Method 300.0

(7) Methane by GC/FID Headspace

(8) d<sup>13</sup>C Test method not reported by Zymax Forensics

(9) Acetone by EPA Method 8260b

(10) Phosphorus by EPA Method 365.4



COP0020744

GROUNDWATER - TPH  
Method: EPA 8015M  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	TPH as Gasoline (ug/L)	TPH as Diesel (ug/L)
CR6	W-6	09/20/1999	480	18,000
	CR6-W12	02/10/2000	2,000	32,000
	CR6	05/16/2000	690	NT
CR7	W-7	09/20/1999	4,500	2,800
	CR7-W13	02/10/2000	6,100	8,700
	CR7	05/16/2000	3,400	NT
	CR7	12/14/2000	8,300	NT
CR8	W-8	09/20/1999	50 U	100 U
	CR8-W11	02/10/2000	50 U	100 U
	CR8	05/16/2000	50 U	NT
	CR8	12/14/2000	700	NT
CR10	W-10	09/20/1999	1,200	12,000
	CR10-W10	02/10/2000	1,600	32,000
	CR10	05/15/2000	990	NT
	CR10	12/15/2000	3,600	NT
CR12	CMW101/W7	06/09/99	122,000	609*
	CMW110-W9 (dup)	06/09/99	108,000	1,690*
	W-12	09/21/99	11,000	100 U
	CR12-W7	02/10/00	91,000	2,000 U
	CR21-W8 (dup)	02/10/00	89,000	2,000 U
	CR12	05/15/00	91,000	NT
	CR101A (dup)	05/15/00	93,000	NT
	CR12	12/15/00	16,000	NT
	CR101A (dup)	12/15/00	17,000	NT
CR13	CMW102-W6	06/09/99	32,700	1,330*
	W-13	09/21/99	20,000	1,000 U
	CR13-W6	02/10/00	44,000	3,400
	CR13	05/15/00	41,000	NT
	CR13	12/15/00	45,000	NT
CR14	CMW103-W4	06/09/99	129	199*
	W-14	09/21/99	50 U	520
	CR14-W3	02/09/00	960	1,100
	CR14	05/15/00	110	NT
	CR14	12/15/00	190	NT
CR15	CMW104-W5	06/09/99	98,000	28,100
	W-15	09/21/99	20,000	2,400
	CR15-W5	02/09/00	42,000	230,000
	CR15	05/16/00	25,000	NT
	CR15	12/15/00	18,000	NT
CR16	CMW106-W1	06/08/99	633	3,780

GROUNDWATER - TPH  
Method: EPA 8015M  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	TPH as Gasoline (ug/L)	TPH as Diesel (ug/L)
	W-16	09/21/99	1,400	4,400
	CR16-W2	02/09/00	1,300	3,100
	CR16	05/15/00	230	NT
	CR16	12/15/00	3,000	NT



GROUNDWATER - TPH  
Method: EPA 8015M  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	TPH as Gasoline (ug/L)	TPH as Diesel (ug/L)
CR17	CMW107-W2	06/08/99	50 U	206*
	W-17	09/21/99	50 U	320
	CR17-W1	02/09/00	210	340
	CR17	05/15/00	50 U	NT
	CR17	12/14/00	370	NT
CR18	CMW108-W3	06/08/99	50 U	100 U
	Not Sampled	02/09/00	NS	NS
	Not Sampled	05/15/00	NS	NS
CR19	CMW109-W8	06/08/99	6,590	22,100**
	CR19-W9	02/10/00	76,000	NA
	CR19	05/16/00	7,900	NT
	CR19	12/15/00	7,200	NT
CR20	CR20/W20	07/08/99	6,350	400
	W-20	09/21/99	3,600	1,900
	CR20-W4	02/09/00	6,900	710
	CR20	05/15/00	6,400	NT
	CR20	12/15/00	3,600	NT
CR21A	21A	12/14/00	8,700	NT
CR21B	21B	12/14/00	170	NT
CR22A	22A	12/13/00	5,400	NT
CR22B	22B	12/13/00	3,000	NT
CR23A	23A	12/13/00	2,600	NT
CR23B	23B	12/13/00	2,000	NT
CR24A	24A	12/15/00	520	NT
CR24B	24B	12/12/00	170	NT
CR25	25	12/13/00	3,800	NT
GPW1	GP1	12/13/00	99,000	NT
GPW3	GP3	12/13/00	36,000	NT
NA	TRIP BLANK	02/09/00	50 U	NA

**Notes:**

ug/L = Micrograms per Liter

U = Undetected above detection limit shown

ND = Analyte not detected in the sample

GROUNDWATER - TPH  
Method: EPA 8015M  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	TPH as Gasoline (ug/L)	TPH as Diesel (ug/L)
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NA= Not available

NS = Not sampled

NT = Not tested

WA = Well abandoned

\*Sample pattern does not match the reference diesel standard

\*\*Sample contains motor oil. Motor oil concentration is based on  
TPH diesel calibration

**TABLE 2**  
Groundwater Elevation Data  
Chevron Willbridge Terminal NMR 101001868  
Portland, Oregon

Well ID	Top of Casing Elevation (approx. feet above msl)	Date	Depth to SPH (feet below TOC)	Depth to Water (feet below TOC)	SPH Thickness (feet)	Relative Groundwater Elevation (approx. feet above msl)	Notes
City Benchmark	36.55 (monument)						
CR4	35.05*	08/17/99	-	6.52	-	28.53	
		09/20/99	-	6.83	-	28.22	
		02/09/00	-	5.47	-	29.58	
		05/09/00	NM	NM	NM	NM	NOTE (3)
		05/15/00	-	5.63	-	29.42	
		07/11/00	NM	NM	NM	NM	
		08/14/00	-	7.09	-	27.96	
		12/12/00	-	7.16	-	27.89	
CR6	35.61*	03/30/99	-	11.27	-	24.34	
		08/16/99	-	12.96	-	22.65	NOTE (4)
		09/20/99	13.33	13.37	0.04	22.27	
		02/09/00	-	11.99	-	23.62	NOTE (1)
		05/09/00	NM	NM	NM	NM	NOTE (3)
		05/15/00	-	12.24	-	23.37	NOTE (1)
		07/11/00	-	12.71	-	22.90	NOTE (1)
		08/14/00	13.13	13.15	0.02	22.48	NOTE (1)
		12/12/00	-	13.53	-	22.08	NOTE (1)
CR7	35.57*	03/30/99	-	8.96	-	26.61	
		08/16/99	-	11.13	-	24.44	
		09/20/99	11.85	11.90	0.05	23.71	
		02/09/00	9.62	9.66	0.04	25.94	NOTE (1)
		05/09/00	10.05	10.11	0.06	25.51	NOTE (1)
		05/15/00	10.00	10.04	0.04	25.56	NOTE (1)
		07/11/00	-	10.83	-	24.74	NOTE (1)
		08/14/00	-	11.34	-	24.23	NOTE (1)
		12/12/00	-	11.57	-	24.00	NOTE (1)
CR8	33.14*	03/30/99	-	5.35	-	27.79	
		08/16/99	-	7.26	-	25.88	
		09/20/99	-	7.72	-	25.42	
		02/09/00	-	5.88	-	27.26	
		05/09/00	-	6.24	-	26.90	
		05/15/00	-	6.06	-	27.08	NOTE (4)
		07/11/00	-	6.86	-	26.28	NOTE (4)
		08/14/00	-	7.36	-	25.78	
		12/12/00	-	7.49	-	25.65	
CR10	35.57*	03/30/99	-	3.69	-	31.88	NOTE (4)
		07/08/99	-	5.55	-	30.02	
		08/16/99	6.27	6.42	0.15	29.27	
		09/20/99	6.93	7.40	0.47	28.56	
		02/09/00	-	4.21	-	31.36	NOTE (2)
		05/09/00	-	4.91	-	30.66	NOTES (1, 4)
		05/15/00	-	4.89	-	30.68	NOTES (1, 4)
		07/11/00	-	5.66	-	29.91	NOTE (1)
		08/14/00	6.52	6.82	0.30	29.00	NOTE (1)
CR12 (CMW101)	35.59	12/12/00	6.39	7.37	0.98	29.00	NOTE (5)
		06/09/99	-	4.85	-	30.74	NOTE (4)
		07/08/99	-	5.08	-	30.51	
		08/16/99	-	5.63	-	29.96	
		09/20/99	-	8.90	-	26.69	
		02/09/00	-	2.66	-	32.93	
		05/09/00	-	4.44	-	31.15	NOTE (4)
		05/15/00	-	4.12	-	31.47	
		07/11/00	-	5.21	-	30.38	NOTE (4)
		08/14/00	-	5.76	-	29.83	NOTE (4)
		12/12/00	-	5.61	-	29.98	

TABLE 2  
Groundwater Elevation Data  
Chevron Willbridge Terminal NMR 101001868  
Portland Oregon

Well ID	Top of Casing Elevation (approx. feet above msl)	Date	Depth to SPH (feet below TOC)	Depth to Water (feet below TOC)	SPH Thickness (feet)	Relative Groundwater Elevation (approx. feet above msl)	Notes
CR13 (CMW102)	35.46	06/09/99	-	5.08	-	30.38	NOTE (4)
		07/08/99	-	5.27	-	30.19	
		08/16/99	-	5.77	-	29.69	
		09/20/99	-	9.05	-	26.41	
		02/09/00	-	3.89	-	31.57	
		05/09/00	-	4.63	-	30.83	
		05/15/00	-	4.37	-	31.09	
		07/11/00	-	5.28	-	30.18	
		08/14/00	-	5.81	-	29.65	
		12/12/00	-	5.64	-	29.82	
CR14 (CMW103)	35.43	06/09/99	-	5.03	-	30.40	
		07/08/99	-	5.27	-	30.16	
		08/16/99	-	5.85	-	29.58	
		09/20/99	-	6.14	-	29.29	
		02/09/00	-	3.98	-	31.45	
		05/09/00	-	4.66	-	30.77	
		05/15/00	-	4.33	-	31.10	
		07/11/00	-	5.41	-	30.02	
		08/14/00	-	6.01	-	29.42	
		12/12/00	-	5.87	-	29.56	
CR15 (CMW104)	35.42	06/09/99	-	9.06	-	26.36	
		07/08/99	9.41	9.44	0.03	26.00	
		08/16/99	10.08	10.35	0.27	25.29	
		09/20/99	10.63	11.07	0.44	24.77	
		02/09/00	8.01	8.32	0.31	27.35	
		05/09/00	8.66	8.91	0.25	26.72	
		05/15/00	8.53	8.74	0.21	26.85	
		05/16/00	8.45	8.60	0.15	26.94	
		06/07/00	8.99	9.33	0.34	26.37	
		07/11/00	9.70	10.02	0.32	25.66	
		08/14/00	10.39	10.76	0.37	24.96	
		12/12/00	10.56	10.60	0.04	24.85	
CR16 (CMW106)	34.77	06/09/99	-	11.05	-	23.72	
		07/08/99	-	11.61	-	23.16	
		08/16/99	-	11.82	-	22.95	
		09/20/99	-	12.00	-	22.77	
		02/09/00	-	10.39	-	24.38	
		05/09/00	-	11.10	-	23.67	
		05/15/00	-	11.12	-	23.65	
		07/11/00	-	11.86	-	22.91	
		08/14/00	-	11.96	-	22.81	
		12/12/00	-	11.95	-	22.82	
CR17 (CMW107)	34.46	06/09/99	-	6.90	-	27.56	
		07/08/99	-	7.15	-	27.31	
		08/16/99	-	7.81	-	26.65	
		09/20/99	-	8.35	-	26.11	
		02/09/00	-	6.41	-	28.05	
		05/09/00	-	6.80	-	27.66	
		05/15/00	-	6.68	-	27.78	
		07/11/00	-	7.50	-	26.96	
		08/14/00	-	8.21	-	26.25	
		12/12/00	-	8.26	-	26.20	

TABLE 2  
Groundwater Elevation Data  
Chevron Willbridge Terminal NMR 101001868  
Portland, Oregon

Well ID	Top of Casing Elevation (approx. feet above msl)	Date	Depth to SPH (feet below TOC)	Depth to Water (feet below TOC)	SPH Thickness (feet)	Relative Groundwater Elevation (approx. feet above msl)	Notes
CR18 (CMW108)	34.84	06/09/99	-	3.77	-	31.07	
		07/08/99	-	4.14	-	30.70	
		08/16/99	-	5.19	-	29.65	
		09/20/99	NM	NM	NM	NM	
		02/09/00	NM	NM	NM	NM	NOTE (3)
		05/09/00	NM	NM	NM	NM	NOTE (3)
		05/15/00	NM	NM	NM	NM	NOTE (3)
		07/11/00	NM	NM	NM	NM	NOTE (3)
		08/14/00	NM	NM	NM	NM	NOTE (3)
		12/12/00	NM	NM	NM	NM	NOTE (3)
CR19 (CMW109)	35.49	06/08/99	-	5.10	-	30.39	NOTE (4)
		07/08/99	5.27	6.24	0.97	30.05	
		08/16/99	5.87	7.65	1.78	29.30	
		09/20/99	6.38	8.86	2.48	28.66	
		02/09/00	3.35	5.94	2.59	31.67	
		05/09/00	4.38	6.19	1.81	30.78	NOTE (5)
		05/15/00	4.22	4.27	0.05	31.26	
		05/16/00	4.26	4.32	0.06	31.22	
		06/07/00	4.78	5.57	0.79	30.57	NOTE (6)
		07/11/00	5.35	6.17	0.82	29.99	
		08/14/00	5.94	7.50	1.56	29.27	
		12/12/00	5.90	8.69	2.79	29.09	NOTE (5)
CR20	35.14	07/08/99	-	7.69	-	27.45	
		08/16/99	-	8.50	-	26.64	
		09/20/99	-	9.14	-	26.00	
		02/09/00	-	6.67	-	28.47	
		05/09/00	-	7.25	-	27.89	NOTE (4)
		05/15/00	-	6.98	-	28.16	NOTE (4)
		07/11/00	-	8.15	-	26.99	NOTE (4)
		08/14/00	-	8.95	-	26.19	NOTE (4)
		12/12/00	-	9.12	-	26.02	
CR21A	34.11	12/12/00	-	5.54	-	28.57	
CR21B	34.36	12/12/00	-	6.53	-	27.83	
CR22A/GPW6	34.80	12/12/00	-	11.92	-	22.88	
CR22B	35.19	12/12/00	-	11.27	-	23.92	
CR23A	36.35	12/12/00	-	13.56	-	22.79	
CR23B	36.27	12/12/00	-	12.57	-	23.70	
CR24A	36.21	12/12/00	-	15.15	-	21.06	
CR24B	36.32	12/12/00	-	13.78	-	22.54	
CR25	34.27	12/12/00	-	8.23	-	26.04	
GPW1	34.66	12/12/00	-	12.99	-	21.67	
GPW2	34.98	12/12/00	-	NM	-	NM	
GPW3	35.08	12/12/00	-	12.23	-	22.85	
GPW4	35.07	12/12/00	-	NM	-	NM	
GPW5	34.85	12/12/00	-	NM	-	NM	

**TABLE 2**  
Groundwater Elevation Data  
Chevron Willbridge Terminal NMR 101001868  
Portland, Oregon

Well ID	Top of Casing Elevation (approx. feet above msl)	Date	Depth to SPH (feet below TOC)	Depth to Water (feet below TOC)	SPH Thickness (feet)	Relative Groundwater Elevation (approx. feet above msl)	Notes
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\*Casing elevations for CR6-CR10 reported in Willbridge RI/FS document

Elevations shown in ***bold italics*** indicate that separate-phase product was measured  
DTW values shown are ***calculated*** based on thickness of SPH and assuming density of product is 0.82 g/ml

NOTE (1): Absorbant sock in well.

NOTE (2): Absorbant sock in well; SPH not measured but observed during purging

NOTE (3): Well was covered with standing water and/or was inaccessible

NOTE (4): Heavy sheen measured or observed

NOTE (5): SPH was pumped out of wells after DTW measurements

NOTE (6): SPH samples were collected from CR15 and CR19 after DTW measurements

NM = Not Measured

GROUNDWATER Oxygenate Data  
Method: GGC (OXY)  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Ethanol (ug/L)	TBA (ug/L)	MTBE (ug/L)	DIPE (ug/L)	ETBE (ug/L)	TAME (ug/L)
CR6	CR6	03/30/99	10,000 U	NT	NT	NT	NT	NT
	817CR6-W9	08/17/99	200 U	40 U	2 U	2 U	10 U	10 U
	W-6	09/20/99	200 U	40 U	2 U	2 U	10 U	10 U
	CR6-W12	02/10/00	50 U	6.8	1.0	0.5 U	0.5 U	0.5 U
	CR6	05/16/00	50 U	6.5	1.1	0.5 U	0.5 U	0.5 U
CR7	CR7	03/30/99	10,000 U	NT	NT	NT	NT	NT
	817CR7-W10	08/17/99	200 U	40 U	159	2 U	10 U	10 U
	W-7	09/20/99	200 U	40 U	70	2 U	10 U	10 U
	CR7-W13	02/10/00	100 U	70	86	1.7	1 U	2.7
	CR7	05/16/00	50 U	55	110	1.9	2.0	4.1
	CR7	12/14/00	1000 U	100 U	170	10 U	10 U	10 U
CR8	CR8	03/30/99	10,000 U	NT	NT	NT	NT	NT
	Not Sampled	08/17/99	NS	NS	NS	NS	NS	NS
	W-8	09/20/99	200 U	40 U	2 U	2 U	10 U	10 U
	CR8-W11	02/10/00	50 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
	CR8	05/16/00	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U
	CR8	12/14/00	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U
CR10	CR10	03/30/99	10,000 U	NT	NT	NT	NT	NT
	Not Sampled	08/17/99	NSP	NSP	NSP	NSP	NSP	NSP
	CR10-W10	02/10/00	50 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
	CR10	05/15/00	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U
	CR10	12/15/00	100 U	10 U	1.0 U	1.0 U	1.0 U	1.0 U
CR12	CMW101/W7	06/09/99	16,100,000	20,000 U	1,000 U	1,000 U	5,000 U	5,000 U
	CMW110-W9 (dup)	06/09/99	20,100,000	20,000 U	1,000 U	1,000 U	5,000 U	5,000 U
	817CR12-W7	08/17/99	200 U	40 U	2 U	2 U	10 U	10 U
	W-12	09/21/99	963,000	20,000 U	1,000 U	1,000 U	5,000 U	5,000 U
	CR12-W7	02/10/00	65,000	100 U	10 U	10 U	10 U	10 U
	CR21-W8 (dup)	02/10/00	70,000	100 U	10 U	10 U	10 U	10 U
	CR12	05/15/00	6,200	200 U	20 U	20 U	20 U	20 U

GROUNDWATER Oxygenate Data  
Method: GGC (OXY)  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Ethanol (ug/L)	TBA (ug/L)	MTBE (ug/L)	DIPE (ug/L)	ETBE (ug/L)	TAME (ug/L)
	CR101A (dup)	05/15/00	6,600	200 U	20 U	20 U	20 U	20 U
	CR12	12/15/00	48,000	200 U	20 U	20 U	20 U	20 U
	CR101A (dup)	12/15/00	53,000	200 U	20 U	20 U	20 U	20 U



GROUNDWATER Oxygenate Data  
Method: GGC (OXY)  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Ethanol (ug/L)	TBA (ug/L)	MTBE (ug/L)	DIPE (ug/L)	ETBE (ug/L)	TAME (ug/L)
CR13	CMW102-W6	06/09/99	4,740,000	20,000 U	1,000 U	1,000 U	5,000 U	5,000 U
	CR13/W6	08/17/99	10,000 U	2,000 U	100 U	100 U	500 U	500 U
	W-13	09/21/99	5,300,000	20,000 U	1,000 U	1,000 U	5,000 U	5,000 U
	CR13-W6	02/10/00	11,000	100 U	12	10 U	10 U	10 U
	CR13	05/15/00	2,000 U	200 U	20 U	20 U	20 U	20 U
	CR13	12/15/00	9,900	200 U	20 U	20 U	20 U	20 U
CR14	CMW103-W4	06/09/99	11,300	40 U	2 U	2 U	10 U	10 U
	817CR14-W5	08/17/99	200 U	40 U	2 U	2 U	10 U	10 U
	817CR101-W10A (dup)	08/17/99	200 U	40 U	2 U	2 U	10 U	10 U
	W-14	09/21/99	200 U	40 U	2 U	2 U	10 U	10 U
	CR14-W3	02/09/00	50 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
	CR14	05/15/00	50 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
	CR14	12/15/00	50 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
CR15	CMW104-W5	06/09/99	200 U	40 U	174	2 U	10 U	10 U
	Not Sampled	08/17/99	NSP	NSP	NSP	NSP	NSP	NSP
	CR15-W5	02/09/00	4,000	100 U	160	10 U	10 U	10 U
	CR15	05/15/00	500 U	50 U	150	6.7	5.0 U	5.0 U
	CR15	12/15/00	2000 U	200 U	190	20 U	20 U	20 U
CR16	CMW106-W1	06/08/99	200 U	40 U	2 U	2 U	10 U	10 U
	816CR16-W2	08/16/99	200 U	40 U	14	2 U	10 U	10 U
	W-15	09/21/99	4,170	40 U	106	14	10 U	10 U
	CR16-W2	02/09/00	50 U	5 U	8.4	0.5 U	0.5 U	0.5 U
	CR16	05/15/00	50 U	11	20.0	0.7	0.5 U	0.5 U
	CR16	12/15/00	50 U	5.7	20.0	1.1	0.5 U	0.5 U
CR17	CMW107-W2	06/08/99	200 U	40 U	2 U	2 U	10 U	10 U
	816CR17-W1	08/16/99	200 U	40 U	2 U	2 U	10 U	10 U
	CR17-W1	02/09/00	50 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
	CR17	05/15/00	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U
	CR17	12/14/00	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U

GROUNDWATER - Oxygenate Data  
Method: GGC (OXY)  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Ethanol (ug/L)	TBA (ug/L)	MTBE (ug/L)	DIPE (ug/L)	ETBE (ug/L)	TAME (ug/L)
CR18	CMW108-W3	06/08/99	200 U	40 U	2 U	2 U	10 U	10 U
	816CR18-W3	08/16/99	200 U	40 U	2 U	2 U	10 U	10 U
	Not Sampled	02/09/00	NS	NS	NS	NS	NS	NS
	Not Sampled	05/15/00	NS	NS	NS	NS	NS	NS
CR19	CMW109-W8	06/08/99	775,000	800 U	40 U	40 U	200 U	200 U
	Not Sampled	08/17/99	NSP	NSP	NSP	NSP	NSP	NSP
	CR19-W9	02/10/00	1,000	50 U	5 U	5 U	5 U	5 U
	CR19	05/16/00	120,000	500 U	65	50 U	50 U	50 U
	CR19	12/15/00	2,600	200 U	61	20 U	20 U	20 U
CR19 (FREE-PHASE PRODUCT)	CR19/Product	07/08/99	100 U	50 U	50 U	50 U	500 U	500 U
	0210CR PRODUCT	02/10/00	100 U	50 U	50 U	50 U	50 U	50 U
CR20	CR20/W20	07/08/99	200 U	40 U	64	2 U	10 U	10 U
	817CR20-W4	08/17/99	200 U	40 U	82	2 U	10 U	10 U
	CR20-W4	02/09/00	500 U	50 U	21	5 U	5 U	5 U
	CR20	05/15/00	500 U	50 U	13	5.0 U	5.0 U	5.0 U
	CR20	12/15/00	500 U	50 U	11	5.0 U	5.0 U	5.0 U
CR21A	21A	12/14/00	5000 U	500 U	100	50 U	50 U	50 U
CR21B	21B	12/14/00	50 U	5.0 U	0.5 U	15	0.5 U	0.5 U
CR22A	22A	12/13/00	2000 U	200 U	83.0	20 U	20 U	20 U
CR22B	22B	12/13/00	50 U	5.0 U	3.4	0.5 U	0.5 U	0.5 U
CR23A	23A	12/13/00	50 U	32.0	77	3.5	0.5 U	0.5 U
CR23B	23B	12/13/00	50 U	9.1	53	2.2	0.5 U	0.5 U

GROUNDWATER Oxygenate Data  
Method: GGC (OXY)  
Chevron Willbridge NMS 101001868

Well Location	Sample Identification	Date Sampled	Ethanol (ug/L)	TBA (ug/L)	MTBE (ug/L)	DIPE (ug/L)	ETBE (ug/L)	TAME (ug/L)
CR24A	24A	12/15/00	50 U	5.0 U	0.5 U	0.5 U	0.5 U	0.5 U
CR24B	24B	12/12/00	50 U	5.0 U	0.5 U	1.2	0.5 U	0.5 U
CR25	25	12/13/00	200 U	20 U	2.8	21	2 U	2 U
GPW1	GP1	12/13/00	5000 U	500 U	450	50 U	50 U	50 U
GPW3	GP3	12/13/00	5000 U	500 U	2,100	50 U	50 U	50 U

**Notes:**

ug/L = Micrograms per Liter

U = Undetected above laboratory detection limit shown

ND = Analyte not detected in the sample

NT = Not tested

NA= Not available

NS = Not sampled

NSP = Not sampled due to presence of free-phase product

MTBE=Methyl tert-Butyl Ether

DIPE=Di-isopropyl Ether

ETBE=Ethyl tert-Butyl Ether

TAME=tert-Amyl Methyl Ether

TBA = tert-Butanol (t-Butyl Alcohol)

BLE 1  
Monitoring Well Construction Data  
Chevron Willbridge Terminal NMR 101001868  
Portland, Oregon

Well ID	Monument Elevation (approx. feet above msl)	Well Casing Diameter	Top of Casing Elevation (approx. feet above msl)	Total Depth (feet bgs)	Approx. Screened Interval (feet bgs)	Approx. Screened Interval Elev. (feet above msl)	WRD Start Card No.	WRD Well Label No.
City Benchmark	36.55	-	-	-	-	-		
CR6	NR	4" PVC	35.61*	NR	NR	NR	NR	NR
CR7	NR	4" PVC	35.57*	NR	NR	NR	NR	NR
CR8	NR	4" PVC	33.14*	NR	NR	NR	NR	NR
CR10	NR	4" PVC	35.57*	NR	NR	NR	NR	NR
CR12 (CMW101)	35.94	2" PVC	35.59	15.63	5.38-15.38	30.56-20.56	125906	L36076
CR13 (CMW102)	35.88	2" PVC	35.46	14.97	4.72-14.72	31.16-21.16	125907	L36078
CR14 (CMW103)	35.81	2" PVC	35.43	15.38	5.13-15.13	30.68-20.68	125954	L36079
CR15 (CMW104)	35.76	2" PVC	35.42	15.44	5.19-15.19	30.57-20.57	125955	L36080
CR16 (CMW106)	35.04	2" PVC	34.77	15.74	5.49-15.49	29.55-19.55	125956	L36081
CR17 (CMW107)	34.96	2" PVC	34.46	14.45	4.20-14.20	30.76-20.76	125957	L36082
CR18 (CMW108)	35.16	2" PVC	34.84	14.49	4.24-14.24	30.92-20.92	125958	L36083
CR19 (CMW109)	36.01	2" PVC	35.49	15.61	5.36-15.36	30.65-20.65	125959	L36084
CR20	35.72	2" PVC	35.14	15.52	5.27-15.27	30.45-20.45	122765	L33512
CR21A	NM	3/4" PVC	34.11	20.0	5.0-20.0	29.11-14.11		

TABLE 1  
Monitoring Well Construction Data  
Chevron Willbridge Terminal NMR 101001868  
Portland, Oregon

Well ID	Monument Elevation (approx. feet above msl)	Well Casing Diameter	Top of Casing Elevation (approx. feet above msl)	Total Depth (feet bgs)	Approx. Screened Interval (feet bgs)	Approx. Screened Interval Elev. (feet above msl)	WRD Start Card No.	WRD Well Label No.
CR21B	NM	2" PVC	34.36	41.1	36.1-41.1	(-1.74)-(-6.74)	134630	L43628
CR22A (GPW6)	NM	3/4" PVC	34.80	20.0	5.0-20.0	29.80-14.80	132674	L40221
CR22B	NM	2" PVC	35.19	40.2	35.2-40.2	(-0.01)-(-5.01)		
CR23A	NM	3/4" PVC	36.35	20.0	5.0-20.0	31.35-16.35		
CR23B	NM	2" PVC	36.27	40.7	35.7-40.7	0.57-(-4.43)	134632	L43630
CR24A	NM	3/4" PVC	36.21	20.0	5.0-20.0	31.21-16.21		
CR24B	NM	2" PVC	36.32	41.0	36.0-41.0	0.32-(-4.68)		L43629
CR25A	NM	2" PVC	34.27	19.6	4.6-19.6	29.27-14.67	134643	
GPW1	NM	3/4" PVC	34.66	20.0	5.0-20.0	29.66-14.66	132669	L40216
GPW3	NM	3/4" PVC	35.08	20.0	5.0-20.0	30.08-15.08	132671	L40218

NOTES:

\*Casing elevations for CR6-CR10 reported in Willbridge RI/FS document  
NR = Not Reported by Chevron

Field-Measured Groundwater Parameters  
Chevron Willbridge Terminal NMR 101001868  
Portland, Oregon

Well Location	Date Sampled	Field-Measured Dissolved Oxygen (mg/L)	Field-Measured Carbon Dioxide (mg/L)	Field-Measured Dissolved Iron (mg/L)	pH	Temperature (°F)	Specific Conductance (uS/cm)	ORP	Notes
CR6	03/30/99	1 U	165	NT	6.8	60.0	829	NS	
	06/09/99	NS	NS	NS	NS	NS	NS	NS	
	08/17/99	1 U	>300	NT	5.9	77.1	981	NS	NOTE (1)
	09/20/99	1 U	>250	NT	7.9	68.0	786	NS	
	02/10/00	NS (turbid)	NS (turbid)	NT	6.2	60.0	464	NS	NOTES (1,2)
	05/16/00	NS (turbid)	NS (turbid)	3.7	6.8	66.0	408	NS(e)	NOTE (1)
	08/15/00	NS (turbid)	NS (turbid)	5.0	6.9	67.7	711	NS(e)	
	12/14/00	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS	
CR7	03/30/99	1 U	235	NT	7.3	58.5	1,227	NS	
	06/09/99	NS	NS	NS	NS	NS	NS	NS	
	08/17/99	1	>500	NT	6.1	72.1	976	NS	NOTE (2)
	09/20/99	1	>250	NT	7.9	69.0	802	NS	
	02/10/00	NS (turbid)	NS (turbid)	NT	5.7	59.7	1,092	NS	NOTE (2)
	05/16/00	1.9	>100	NT	7.1	64.0	809	NS(e)	NOTE (2)
	08/15/00	1.3	>100	5.5	6.8	67.7	641	NS(e)	
	12/14/00	0.1	>100	2.6	6.6	55.4	1,420	-49	
CR8	03/30/99	0.8	60	NT	7.1	57.0	403	NS	
	06/09/99	NS	NS	NS	NS	NS	NS	NS	
	08/17/99	NS	NS	NS	NS	NS	NS	NS	
	09/20/99	1 U	>250	NT	8.3	75.0	305	NS	
	02/10/00	0.2 U	35	NT	6.6	58.7	456	NS	
	05/16/00	1.3	60	0.7	6.9	63.0	339	NS(e)	NOTE (2)
	07/11/00	0.2 U	>100	NT	8.2	63.1	372	NS(e)	
	08/15/00	0.4	60	1.3	7.3	64.2	271	NS(e)	
CR10	12/14/00	0.5	25	2.6	6.3	49.0	538	23	
	03/30/99	1 U	85	NT	7.6	57.0	416	NS	
	06/09/99	NS	NS	NS	NS	NS	NS	NS	
	08/17/99	NSP	NSP	NSP	NSP	NSP	NSP	NS	
	09/20/99	1 U	50	NT	8.2	69.0	362	NS	NOTE (2)
	02/10/00	0.2 U	125	NT	6.1	55.9	442	NS	NOTE (2)
	05/15/00	1 U	>100	4.0	6.7	58.1	302	NS(e)	NOTE (2)
	08/15/00	NSP	NSP	5.0	NSP	NSP	NSP	NS(e)	
	12/15/00	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NOTE (3)

Field-Measured Groundwater Parameters  
Chevron Willbridge Internal NMR 101001868  
Portland, Oregon

Well Location	Date Sampled	Field-Measured Dissolved Oxygen (mg/L)	Field-Measured Carbon Dioxide (mg/L)	Field-Measured Dissolved Iron (mg/L)	pH	Temperature (°F)	Specific Conductance (uS/cm)	ORP	Notes
CR12	06/09/99	0.6	45	NT	6.5	61.1	137	NS	
	08/17/99	1 U	60	NT	6.4	69.1	120	NS	
	09/21/99	NS (turbid)	NS (turbid)	NT	6.4	70.0	178	NS	
	02/10/00	0.2 U	55	NT	5.7	52.0	170	NS	
	05/15/00	1.4	95	4.0	6.7	58.3	266	NS(e)	
	07/11/00	0.2 U	>100	NT	6.7	63.7	138	NS(e)	
	08/14/00	0.5	40	4.0	7.0	69.1	106	NS(e)	
	12/15/00	1.8	>100	3.0	NS(e)	NS(e)	NS(e)	33	
CR13	06/09/99	0.2	95	NT	6.6	58.8	278	NS	
	08/17/99	1 U	>500	NT	6.0	66.5	241	NS	
	09/21/99	NS (turbid)	NS (turbid)	NT	6.1	71.0	370	NS	
	02/10/00	0.2 U	95	NT	6.2	50.9	508	NS	
	05/15/00	0.9	75	4.0	6.7	57.7	232	NS(e)	
	08/14/00	1.7	100	5.5	6.9	66.8	257	NS(e)	
	12/15/00	<0.1	>100	NS(e)	NS(e)	NS(e)	NS(e)	-32	
CR14	06/09/99	1	45	NT	7.7	56.0	135	NS	
	08/17/99	1 U	45	NT	6.5	63.3	103	NS	
	09/21/99	1	50	NT	7.8	64.0	111	NS	
	02/09/00	0.2 U	60	NT	6.1	51.2	144	NS	
	05/15/00	0.8	45	> 5.0	7.0	53.4	159	NS(e)	
	08/14/00	0.4	35	4.5	7.6	61.6	111	NS(e)	
	12/15/00	0.3	35	4.9	NS(e)	NS(e)	NS(e)	-7	
CR15	06/09/99	2	NS (turbid)	NT	6.3	57.5	809	NS	NOTE (3)
	08/17/99	NSP	NSP	NSP	NSP	NSP	NSP	NS	NOTE (3)
	09/21/99	NSP	NSP	NSP	NSP	NSP	NSP	NS	NOTE (3)
	02/09/00	NS (turbid)	NS (turbid)	NT	5.5	54.8	1,175	NS	NOTE (3)
	05/16/00	NS (turbid)	NS (turbid)	> 5.0	7.0	69.0	780	NS(e)	NOTE (3)
	08/14/00	NSP	NSP	5.0	NSP	NSP	NSP	NS(e)	NOTE (3)
	12/15/00	1.0	>100	4.5	NS(e)	NS(e)	NS(e)	-55	NOTE (3)
CR16	06/08/99	1	325	NT	6.3	61.5	1,081	NS	
	08/16/99	NS (turbid)	310	NT	6.2	64.2	983	NS	NOTE (1)
	09/21/99	1	>250	NT	7.9	63.0	704	NS	
	02/09/00	0.2 U	>250	NT	NS(e)	59.5	1,009	NS	
	05/15/00	1 U	>100	> 5.0	7.1	57.9	1,144	NS(e)	
	08/14/00	1.8	>100	5.0	6.5	70.1	896	NS(e)	
	12/15/00	4.1	110	NS(e)	NS(e)	NS(e)	NS(e)	82	

Field-Measured Groundwater Parameters  
Chevron Willbridge Internal NMR 101001868  
Portland, Oregon

Well Location	Date Sampled	Field-Measured Dissolved Oxygen (mg/L)	Field-Measured Carbon Dioxide (mg/L)	Field-Measured Dissolved Iron (mg/L)	pH	Temperature (°F)	Specific Conductance (uS/cm)	ORP	Notes
CR17	06/08/99	1	80	NT	6.7	57.4	198	NS	
	08/16/99	1 U	120	NT	6.6	65.8	169	NS	
	09/21/99	1	110	NT	7.6	64.0	152	NS	
	02/09/00	0.2 U	110	NT	5.7	55.4	242	NS	
	05/15/00	0.9	35	> 5.0	7.1	54.7	235	NS(e)	
	08/14/00	0.3	55	5.0	7.3	60.8	142	NS(e)	
	12/14/00	0.1	35	4.8	NS(e)	NS(e)	NS(e)	-82	
CR18	06/08/99	4	65	NT	6.5	55.3	229	NS	
	08/16/99	1	55	NT	6.5	63.7	93	NS	NOTE (1)
	09/21/99	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS	
	02/09/00	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS	
	05/15/00	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS	
	08/14/00	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS	
	12/14/00	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS (no access)	NS	
CR19	06/09/99	0.2 U	275	NT	6.0	63.8	647	NS	
	08/17/99	NSP	NSP	NSP	NSP	NSP	NSP	NS	
	09/20/99	NSP	NSP	NSP	NSP	NSP	NSP	NS	
	02/10/00	NSP	NSP	NSP	NSP	NSP	NSP	NS	
	05/16/00	NS (turbid)	NS (turbid)	4.0	6.9	66.0	502	NS(e)	NOTES (1,3)
	08/14/00	NSP	NSP	4.5	NSP	NSP	NSP	NS(e)	
	12/15/00	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NOTE (3)
CR20	07/08/99	0.2 U	155	NT	6.4	61.3	333	NS	
	08/17/99	1 U	125	NT	6.5	61.3	231	NS	
	09/21/99	1	100	NT	7.6	64.0	231	NS	
	02/09/00	0.2 U	125	NT	6.0	53.0	296	NS	
	05/15/00	1.2	80	> 5.0	6.8	53.8	210	NS(e)	NOTE (2)
	08/14/00	0.5	65	5.5	7.2	58.7	160	NS(e)	
	12/15/00	1.1	45	5.0	NS(e)	NS(e)	NS(e)	NS	
CR21A	12/14/00	NS(d)	NS(d)	3.0	NS(d)	NS(d)	NS(d)	NS(d)	NOTE (1)
CR21B	12/14/00	0.3	70	2.7	7.6	53.4	991	NS(e)	
CR22A (formerly GPW6)	12/12/00	NS(d)	NS(d)	NS(d)	NS(d)	NS(d)	NS(d)	NS(d)	NOTE (1)
CR22B	12/12/00	0.3	65	2.5	6.5	57.0	770	-100 U	



Field-Measured Groundwater Parameters  
Chevron Willbridge Terminal NMR 101001868  
Portland, Oregon

Well Location	Date Sampled	Field-Measured Dissolved Oxygen (mg/L)	Field-Measured Carbon Dioxide (mg/L)	Field-Measured Dissolved Iron (mg/L)	pH	Temperature (°F)	Specific Conductance (uS/cm)	ORP	Notes
CR23A	12/13/00	NS(d)	NS(d)	NS(d)	NS(d)	NS(d)	NS(d)	NS(d)	NOTE (1)
CR23B	12/13/00	0.1 U	105	2.5	6.6	52.0	1,254	53	
CR24A	12/12/00	NS(d)	NS(d)	NS(d)	NS(d)	NS(d)	NS(d)	NS(d)	NOTE (1)
CR24B	12/12/00	1.0	90	4.0	7.1	54.0	1,132	138	
CR25A	12/13/00	0.7	80	0.8	7.2	58.0	1,026	163	

**NOTES:**

mg/L = Milligrams per Liter

ND = Analyte not detected in the sample

NT = Not tested

NS = Not sampled

NS(d) = Not sampled because well purged dry and yielded inadequate volume for measuring field parameters

NS(e) = Not sampled due to equipment error

NSP = Not sampled due to presence of free-phase product

NOTE (1) Indicates the well was purged dry

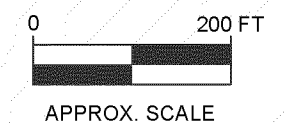
NOTE (2) Indicates that heavy sheen or thin SPH was observed

NOTE (3) Indicates that measurable SPH was present



# **LEGEND**

- △ Dredged Sample Location (Lower Willamette Group)
- Subsurface Sample Location (Lower Willamette Group)
- ▲ Surface Water/Sediment Sample Location (IT Corporation, December 1998)
- ⊗ Riverfront Push-Probe Location (IT Corporation, October 1998)
- ⊙ Seep Sample Location (KHM, April 2003; Delta, July 2003)
- Storm Sewer (60-inch)
- Existing Storm Sewer Cut-Off Wall Constructed by KHM Environmental Management, 2002.



**FIGURE 2**  
**RIVERFRONT/SEEP SAMPLES/NEAR SHORE**  
**EXISTING WALL/PROPOSED WALL**

**Willbridge Terminals**  
Portland, Oregon

PROJECT NO. PTWB-01H	DRAWN BY CRF 6/8/04
FILE NO. PTWB	PREPARED BY CRF 11/5/04
REVISION NO.	REVIEWED BY





# BORING NO. CHEV-11P-1 (CONTINUED)

FIELD NO. 000001 DATE BORED 10-18-98  
 CHECKED BY LK/ML DATE CHECKED 10-19-98  
 APPROXIMATE TOTAL DEPTH 24.0' GROUND SURFACE ELEVATION 100.0'  
 TOTAL DEPTH 24.0'

ANNOTATION: 10.0' 10.0'  
 10.0' 10.0'

Brown clay (17%) with trace of grey silt.

Brown SAND, as above

SAND, as above.

Grey sandy SILT: 10% very fine sand, non-plastic, no product odor.

Brown SILT: 10% fine sand; trace mica and mottled low plasticity.

Stiff brown SILT: 5% fine sand; low plasticity; slight black orange mottles

Stiff SILT with grey and orange mottles; no odor; no sheen

BOTTOM OF BORING = 24.0 FEET

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: CHEVRON LUBRICANTS  
 PROJECT NO.: B15-300.1A

DRAWN BY M.J.S. CHECKED BY FILE NAME &



IT CORPORATION

COP0020765

BORING NO. CHEV-HP-2										
COORDINATES <u>N</u>										
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-15-98</u>										
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-15-98</u>										
APPROVED BY <u></u> GROUND SURFACE EL. <u></u>										
TOTAL DEPTH <u>24.0</u>										
DESCRIPTION										
0									ASPHALT	0.5'
									Roadbed GRAVEL, sand.	
										2.5'
	*		10	MOIST					Brown poorly sorted SILTY SAND; 80% sand; 20% silt, no odor.	
5										
									Brown SILTY SAND; same as above.	
				WET						
				MOIST						10.0'
10									Brown SILT; 10% sand, dense, dryer than above; root traces. Dryer than below.	
	*		15						Stiff brown SILT with 10% fine sand, trace mica, grey mottle.	
									Stiff brown sandy SILT with 10% fine sand, trace mica, no odor.	
15										
				SAT					No recovery	
20										
25									BOTTOM OF BORING = 24.0 FEET	
30										
35										

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: CHEVRON LUBRICANTS  
 PROJECT NO.: B15-300.1A

DRAWN BY M.J.S.

CHECKED BY

FILE NAME &

IT CORPORATION



COP0020766

DEPTH IN FEET		SAMPLE RETAINED* PENETRATION (BLOWS/8')		RECOVERY		SAMPLE INTERVAL		P.I.D. (ppm)		MOISTURE CONTENT		DRILLING REMARKS		USCS		PROFILE		BORING NO. CHEV-HP-3	
																		COORDINATES <sup>N</sup> _____	
																		FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-14-98</u>	
																		CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-14-98</u>	
																		APPROVED BY _____ GROUND SURFACE EL. _____	
																		TOTAL DEPTH <u>20.0'</u>	
																		DESCRIPTION	
0																		ASPHALT Deep/hard roadbed concrete Fill? <u>0.5'</u>	
																		GRAVEL Roadbed, occasional sand and sil.	
																		<u>3.0'</u>	
5																		Brown sandy SILT; 10% sand, orange mottle.	
																		Brown sandy SILT; 10% fine sand.	
10		*						25										Stiff brown, mottled SILT; with 10% fine sand, trace gravel and organics, no odor.	
		*						9		SAT									
										WET									
15																		SILT, as above; no product odor.	
20																		BOTTOM OF BORING = 20.0 FEET	
25																			
30																			
35																			

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: CHEVRON LUBRICANTS N. OF TRUCK L. RACK  
 PROJECT NO.: B15-300.1A

DRAWN BY M.J.S. | CHECKED BY \_\_\_\_\_ | FILE NAME & \_\_\_\_\_



IT CORPORATION

COP0020767

DEPTH IN FEET		SAMPLE RETAINED* PENETRATION (BLOWS/6")		RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. CHEV-LS-1	
											COORDINATES <sup>N</sup> <sub>E</sub>	
0											FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-13-98</u>	
											CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-13-98</u>	
											APPROVED BY _____ GROUND SURFACE EL. _____	
											TOTAL DEPTH <u>12.0</u>	
												DESCRIPTION
1.25'									gw		FILL: GRAVEL	
											Gravel and road bed mixed with brown SAND; poorly sorted; grey sand; poorly sorted; 5% non plastic; strong product odor.	
5									sm			
7.25'											Dark grey SAND; grading to dark grey silt; low plasticity; product odor strong; 10% fine sand.	
8.0'									ml		Silty SAND; 80% sand; 20% silt; poorly sorted.	
10									sm			
10.0'									ml		Dark grey SILT; moderate plasticity; 10% sand; product odor strong.	
												BOTTOM OF BORING = 12.0 FEET
15												
20												
25												
30												
35												

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: BEACH  
 PROJECT NO.: B15-200.1A



IT CORPORATION

COP0020768



BORING NO. CHEV-LS-3									
COORDINATES $\begin{matrix} N \\ E \end{matrix}$									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-30-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-30-98</u>									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>16.0'</u>									
DESCRIPTION									
DEPTH IN FEET	SAMPLE RETAINED* PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (bpm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	
0				0	Mst		sm		Rock/Road bed Brown silty SAND, 15% silt; 50% coarse sand; 15% medium; 20% fine sand.
3.0'					Mst				Rock, crushed basalt.
5							gw		Crushed rock.
				4	Wt				Crushed rock; free product in tube and clinging to ??? rock; strong product odor.
									Crushed rock fill.
									Rock-hand probing.
9.0'									SILT, no recovery.
10							ml		Grey sandy SILT; 5% very fine sand, strong product odor.
15				16	Wt				Dense, moist; same as above.
BOTTOM OF BORING = 16.0 FEET									
20									
25									
30									
35									

DRILLING CO.: CRISMAN  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: PRODUCT RECOVERY TRENCH; CHEVRON BEACH  
 PROJECT NO.: B15-200.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	8-06-99	APPROVED BY		DISK NUMBER	



IT CORPORATION

COP0020770



DEPTH IN FEET		SAMPLE RETAINED* PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. CHEV-LS-4			
										COORDINATES			
										FIELD GEOLOGIST	N.W.H.	DATE BEGAN	10-30-98
										CHECKED BY	N.W.H.	DATE FINISHED	10-30-98
										APPROVED BY		GROUND SURFACE EL.	
										TOTAL DEPTH	12.0'		
DESCRIPTION													
										Rootbed-rock.	0.5'		
										SAND, brown silty, 15% silt, 50% coarse sand; 25% medium, 10% fine.	2.75'		
										Drain rock, green geotextile; impermeable.			
										SILT	7.0'		
										Grey silty SAND, 5% silt.	9.0'		
										Grey sandy SILT; 5% fine sand; low plasticity; slight product odor.	10.0'		
BOTTOM OF BORING = 12.0 FEET													

DRILLING CO.: CRISMAN  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: CHEVRON BEACH, RECOVERY TRENCH  
 PROJECT NO.: B15-200.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	8-06-00	APPROVED BY			



ITT CORPORATION

COP0020771

BORING NO. CHEV-RF-1									
COORDINATES $\begin{matrix} N \\ E \end{matrix}$									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-13-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-13-98</u>									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>12.0'</u>									
DESCRIPTION									
DEPTH IN FEET	SAMPLE RETAINED* PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (60m)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	
0									
							gw		1.5' Feet gravel base (ballast), crushed rock.
									Brown poorly sorted SAND; strong product odor.
									Gray black sand; 70% coarse sand, 15% fine; 5% silt.
5	*			40	Mst				
					Wt				
					Sol				
10	*			13			sm		Dark gray SAND, moderate product odor; 5-10% silt, wet, saturated.
									Dark gray SAND, slight product odor.
15	*			5			ml		Gray SILT, slight product odor; no sand; below water table; feels dryish (moist) uniform.
BOTTOM OF BORING = 16.0 FEET									
20									
25									
30									
35									

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: CHEVRON BEACH SOUTHERN  
 PROJECT NO.: B15-200.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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IT CORPORATION

COP0020772

BORING NO. CHEV-RF-2									
COORDINATES $\begin{matrix} N \\ E \end{matrix}$ _____									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-13-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-13-98</u>									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>12.0'</u>									
DEPTH IN FEET	SAMPLE RETAINED* PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0									GRAVEL, rock fill.
1	*						gw		
2									
3									
4									
5									
6									
7									
8									
9									
10	*								
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: CHEVRON BEACH-MIDDLE  
 PROJECT NO.: B15-200.1A


DRAWN BY M.J.S. | CHECKED BY \_\_\_\_\_ | FILE NAME & \_\_\_\_\_



IT CORPORATION

COP0020773

DEPTH IN FEET		SAMPLE RETAINED* PENETRATION (BLOWS/6")		RECOVERY		SAMPLE INTERVAL		P.I.D. (ppm)		MOISTURE CONTENT		DRILLING REMARKS		USCS PROFILE		BORING NO. CHEV-RF-3	
																COORDINATES $\begin{matrix} N \\ E \end{matrix}$	
0																FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-13-95</u>	
																CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-13-95</u>	
																APPROVED BY <u>12.0</u> GROUND SURFACE EL. <u>        </u>	
																TOTAL DEPTH <u>12.0</u>	
DESCRIPTION																	
0																ROCK/GRAVEL CRUSHED ROCK, rootbed.	
																2.0'	
																Dense gray SILT, root traces.	
5		*				7				Mst						Gray sandy SILT, 95% silt; 5% fine sand, trace organics.	
10		*				24				Mst							
15		*				4				Mst							
20																	
25																	
30																	
35																	
BOTTOM OF BORING = 16.0 FEET																	

DRILLING CO.: GEOTECH DRILLING METHOD: GEOPROBE SAMPLING METHOD: MACRO PROJECT NAME: LOCATION: CHEVRON BEACH NORTH OF DOCK PROJECT NO.: B15-200.1A				 IT CORPORATION			
DRAWN BY		M.J.S.		CHECKED BY		FILE NAME &	
DATE		8-10-99		APPROVED BY			

BORING NO. CHEV-RF1-P2									
COORDINATES $\begin{matrix} N \\ E \end{matrix}$									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-30-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-30-98</u>									
APPROVED BY <u></u> GROUND SURFACE EL. <u></u>									
TOTAL DEPTH <u>15.0'</u>									
DESCRIPTION									
ROCK									
Brown SAND; slight product odor.									
Gray SAND, 50% coarse, 30% medium, 10% fine; 10% silt.									
SILT, slight product odor.									
SILT, 10-15% fine sand; slight product odor.									
BOTTOM OF BORING = 15 FEET									
0									
5									
10									
15									
20									
25									
30									
35									

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: 10" HSA  
 SAMPLING METHOD: CUTTINGS  
 PROJECT NAME:  
 LOCATION: 27" STORM AT OHWL  
 PROJECT NO.: B15-100.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	8-10-99	APPROVED BY		FILE NUMBER	



IT CORPORATION

COP0020775

BORING NO. GATX-RF-1									
COORDINATES N _____ E _____									
FIELD GEOLOGIST _____ N.W.H. DATE BEGAN _____									
CHECKED BY _____ N.W.H. DATE FINISHED _____									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH _____ 16.0' _____									
DESCRIPTION									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ccm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	
0									
				6	Mst		gw		Rock base.
				59					Rock fill; with brown SAND.
5					Sat		sm		Dark grey SAND; quartz grains 10%; poorly graded; saturated; 10% silt; 20% fine sand, 70% coarse sand.
	*								Dark grey sandy SILT; 10% fine sand; low plasticity; no product odor.
10							ml		No recovery, very wet.
	*								No recovery, ballast rock caving.
15									
									BOTTOM OF BORING = 16.0 FEET
20									
25									
30									
35									

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: GATX DOCK  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY M.J.S. CHECKED BY FILE NAME

COP0020776

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-RF-2	
										COORDINATES	
										FIELD GEOLOGIST	N.W.H.
										DATE BEGAN	10-29-98
										CHECKED BY	N.W.H.
										DATE FINISHED	10-29-98
										APPROVED BY	
										GROUND SURFACE EL.	
										TOTAL DEPTH	16.0'
										DESCRIPTION	
0										SAND/Beach, 70% medium, 10% coarse, 15% medium, 5% fine.	
1										1.0'	
2				6		Mst				Brown SILT; high in roots and organics, no product odor.	
3										Moderate plasticity; red/brown mottle.	
4										Brown silt same as above.	
5				59						Grey SILT; 25-30% fine sand, no product odor, root traces.	
6											
7											
8											
9		*								Grey sandy SILT; few roots ~10% fine sand, mica flakes.	
10										Fewer root traces/organics.	
11											
12										SILT; dense and dry, moist.	
13											
14										Grey sandy SILT; same as above; no organics.	
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
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28											
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30											
31											
32											
33											
34											
35											

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: DIRECT PUSH  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: GATX DOCK  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY: M.J.S. | CHECKED BY: | FILE NAME:

COP0020777

BORING NO. GATX-RF-3									
COORDINATES <u>N</u>									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-29-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-25-98</u>									
APPROVED BY <u></u> GROUND SURFACE EL. <u></u>									
TOTAL DEPTH <u>14.0</u>									
DESCRIPTION									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	
0									
	*			6	Mst		sw		SAND, beach.
									2.0'
							sm		Brown silty SAND; 5% silt; no product odor.
5					Mst				5.0'
									SILT, brown, sandy, 10% medium sand, root traces.
	*			9	Mst				Brown sandy SILT, root traces, slight black orange gray mottic, 10% fine sand.
10					Wl		ml		Grey sandy SILT; 10% fine sand, gray with brown/orange mottic.
	*			6					Grey sandy SILT, 10% fine root traces.
15									BOTTOM OF BORING = 14.0 FEET
20									
25									
30									
35									

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: PUSH PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: GATX BEACH  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY M.J.S. CHECKED BY  FILE NAME

COP0020778



BORING NO. GATX-RF-4									
COORDINATES <u>N</u> <u>E</u>									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-29-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-29-98</u>									
APPROVED BY <u>                    </u> GROUND SURFACE EL. <u>                    </u>									
TOTAL DEPTH <u>16.0'</u>									
DESCRIPTION									
0	*		5	Mst		ml	Light brown sandy SILT, mica flakes; grey and brown variations, roots and organics.		
							2.5'		
5				Mst		sm	Brown SILT, coarse sand, poorly sorted; 30% coarse; 40% medium; 20% fine; 10% sat.		
	*		9	Wt		$\frac{V}{-}$	SAND; some as above; saturated; wet; no product odor.		
10							9.5'		
				Wt		ml	Grey, fine sandy SILT; low plasticity.		
15	*		6	Sot			Dense; fine grey SILT; low plasticity; no product odor.		
TOTAL DEPTH = 16.0 FEET									
20									
25									
30									
35									

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: PUSH PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: GATX BEACH  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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COP0020779

BORING NO. GATX-LS-1							
COORDINATES $\begin{matrix} N \\ E \end{matrix}$ _____							
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-15-98</u>							
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-15-98</u>							
APPROVED BY _____ GROUND SURFACE EL. _____							
TOTAL DEPTH <u>16.0</u>							
DESCRIPTION							
0							ROCK 1.5'
5	*		5				SAND, reddish brown; poorly graded; 10% silt; no product odor.
							Brown SAND; some as above.
							Grey SAND; some as above; product odor.
10			9			sm	Grey SAND; strong odor as above.
							No Recovery.
15			6				
BOTTOM OF BORING = 16.0 FEET							
20							
25							
30							
35							

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: GATX BEACH S. OF PIER  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
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COP0020780

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-UB-3			
										COORDINATES			
										FIELD GEOLOGIST	N.W.H.	DATE BEGAN	3-31-99
										CHECKED BY	N.W.H.	DATE FINISHED	
										APPROVED BY		GROUND SURFACE EL.	
										TOTAL DEPTH	12.0'		
										DESCRIPTION			
0						Dp				▽ ASPHALT	1.0'		
						Wt/Mst		gm		Rock and sand roadbed; large round rock with sand matrix.	2.0'		
		*		0.5		Mst				▽ Very fine SAND with 10-15% silt; brown.			
5		*				Mst				Very fine sand as above.			
						Wt		sp		Very fine sand; grading coarser; brown; no product odor.			
				0		Wt				Brown sand; medium grained.			
10						Sat				▽ Dark grey, black sand with 5% silt; trace gravel; heavy sheen; diesel odor; (no gravel) same as above; slight product odor.			
						Sat				Depth to water 9.1' below ground surface after sampling.	11.0'		
		*		100		Sat		ml		Stiff; dark brown; grey SILT, low plasticity, occasional rootlets.			
										▽ BOTTOM OF BORING = 12.0 FEET			
										Water at 12.45 feet.			

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE. STORM SEWER  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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COP0020781

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-UB-4	
										COORDINATES	
										FIELD GEOLOGIST	N.W.H. DATE BEGAN 3-31-99
										CHECKED BY	N.W.H. DATE FINISHED
										APPROVED BY	GROUND SURFACE EL.
										TOTAL DEPTH 12.0'	
										DESCRIPTION	
0										ASPHHALT	
1.0'								gw		GRAVEL: graded river rock.	
2.0'										SAND; clean, coarse grey with red and clear quartz grains; 20% quartz coarse.	
3.0'								sw		Sand as above.	
4.0'		*			0						
5.0'											
6.0'											
7.0'		*			0			ml		Silt lense; 2" thick.	
8.0'								sw			
9.0'								ml		Brown silt with 5-10% fine sand.	
10.0'								sm		Black SAND, strong product odor (diesel) many wood fragments and trace gravel.	
11.0'		*			145						
12.0'										BOTTOM OF BORING = 12.0 FEET	
13.0'											
14.0'											
15.0'											
16.0'											
17.0'											
18.0'											
19.0'											
20.0'											
21.0'											
22.0'											
23.0'											
24.0'											
25.0'											
26.0'											
27.0'											
28.0'											
29.0'											
30.0'											
31.0'											
32.0'											
33.0'											
34.0'											
35.0'											

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE. STORM SEWER  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
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COP0020782

BORING NO. GATX-UB-5									
COORDINATES $\begin{matrix} N \\ E \end{matrix}$ _____									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>4-1-99</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED _____									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>12.0'</u>									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0							ml		ASPHALT
							gw		ROCK (roadbed)
					Dry				1.0'
									2.0'
							sm		Brown silty SAND; 20% silt; no product odor.
5	*			140	Mst				4.5'
					Mst				Grey green sandy SILT; very fine sand; faint product odor.
	*			185	Wt		ml		SILT (as above).
10					Wt				
	*			177	Wt				Rootlets, wood, organics, no sheen, moderate product odor.
									BOTTOM OF BORING = 12.0 FEET
15									
20									
25									
30									
35									

DRILLING CO.: CASCADE  
 DRILLING METHOD: HAND AUGER  
 SAMPLING METHOD: BRASS TUBE  
 PROJECT NAME:  
 LOCATION: 10" WOOD VSP ABANDONED STORM SEWER  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY M.J.S. CHECKED BY \_\_\_\_\_ FILE NAME \_\_\_\_\_

COP0020783

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (bpm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-UB-6	
										COORDINATES N _____ E _____	
0										FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>3-31-99</u>	
										CHECKED BY <u>N.W.H.</u> DATE FINISHED _____	
										APPROVED BY _____ GROUND SURFACE EL. _____	
										TOTAL DEPTH <u>12.0'</u>	
										DESCRIPTION	
								ml		ASPHALT 12" 1.0'	
								gw		Coarse clean dark grey SAND with rock (roadbed). 2.5'	
5										Brown to grey SAND; 10% coarse; 60% medium; 25% fine; trace silt.	
		*			0	Mst		sw		SAND as above.	
10		*				Wt				10.0'	
		*			0	Wt		gw		SAND with fine to coarse gravel (fill). GRAVEL, fine, no product odor. Hard object at 11.8 feet.	
										BOTTOM OF BORING = 12 FEET	
15											
20											
25											
30											
35											

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: STORM IN N. BOUND FRONT  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY M.J.S. CHECKED BY \_\_\_\_\_ FILE NAME & \_\_\_\_\_

COP0020784

BORING NO. GATX-UB-7									
COORDINATES $\begin{matrix} N \\ E \end{matrix}$									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>4-1-99</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED _____									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>20.0'</u>									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0									ASPHALT Gray 1.0'
									Brown SAND with silt; 85% fine to medium sand with 15% silt no product odor.
5	*			0	Dp		sm	$\nabla$ .	Very fine brown SAND WITH SILT; 80% sand; 20% silt; no product odor.
	*			1	Mst		ml		SILT WITH SAND; brown, low plasticity silt, with 15% fine sand; no product odor.
10					Wt		sm		Grading to SILTY SAND. SAND WITH SILT; brown.
					Wt		ml		Sandy SILT; 60% silt; 40% fine sand; brown, non-plastic; no product odor.
15	*			15			sm		Silty SAND; 5% silt.
					Wt				SAND; block; 15% silt; fine gravel; no product odor.
20									FILL
									Block SAND; 10% coarse; 35% medium; 55% fine; trace fine gravel; faint product odor or organics.
TOTAL DEPTH = 20.0 FEET									

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: 60" SANITARY IN GS ROOFING PARKING LOT  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY M.J.S. CHECKED BY \_\_\_\_\_ FILE NAME & \_\_\_\_\_

COP0020785





BORING NO. GATX-HP-1									
COORDINATES <u>N</u> <u>E</u>									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>11-05-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u></u>									
APPROVED BY <u></u> GROUND SURFACE EL. <u></u>									
TOTAL DEPTH <u>24.0'</u>									
DESCRIPTION									
DEPTH IN FEET	SAMPLE RETAINED* PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	
0							qw	0.0'	ROCK
							sm	0.5'	Brown silty SAND, 5% coarse; 15% medium; 50% fine, 30% silt.
					Mst		ml	2.5'	Brown SANDY SILT; 40% sand; 60% silt.
								3.0'	Brown SILTY SAND; as above.
5					Mst		sm		Brown SILTY SAND; some as above.
	*			31	Wt		ol	8.50'	Grey SILTY SAND; same as above.
	*			47			ml	8.75'	Organic roots Grey sandy SILT; 20% fine sand. SAND (organics 5% locally dense), 75% silt, no product odor.
10					Wt		ol	10.75'	Organic roots Grey SANDY SILT.
	*			21B	Sat		ml	11.0'	
15					Wt		sm	13.0'	Grey SILTY SAND: 20% coarse, 50% medium; 15% fine, 15% silt, strong product odor.
									Grey SILTY SAND: same as above; moderate product odor.
20							ol	18.5'	Organics, (wood and rootlets).
							ml	19.0'	Grey SILT, moderate product odor, 10% fine sand; 5% organics.
									Grey SANDY SILT, moderate product odor, no organics, no mica.
									Grey SANDY SILT; some as above.
25									BOTTOM OF BORING = 24.0 FEET
30									
35									

DRILLING CO.:  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: OLD LOADING RACK  
 PROJECT NO.: B15-100.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-15-99	APPROVED BY			



IT CORPORATION

COP0020787

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-HP-2	
										COORDINATES $\begin{matrix} N \\ E \end{matrix}$	
										FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>11-05-98</u>	
										CHECKED BY <u>N.W.H.</u> DATE FINISHED _____	
										APPROVED BY _____ GROUND SURFACE EL. _____	
										TOTAL DEPTH <u>24.0'</u>	
										DESCRIPTION	
0						Mst		gw		ASPHALT	2.5'
						Mst		sm		Rock/Soil (Roadbed).	
						Mst				Brown silty SAND; 40% medium sand; 20% fine sand; 30% silt.	2.0'
						Mst		ml		Brown SILT with sand, non plastic, 20% fine sand; no product odor.	3.5'
5						Mst		sm		Brown SAND with silt; some as 2.5-3.5'; no product odor.	4.0'
	*				17						
	*				11	Wt		ml		Brown SILT; non plastic; slight product odor, 10% very fine sand, liquifies.	8.5'
10						Wt				Grey SANDY SILT loose; non plastic, 15% fine sand; slight product odor.	
						Wt					11.5'
15						Wt		sm		Grey SAND, 20% coarse, 40% medium, 30% fine, 10% silt, slight product odor.	
										Grey SAND, some as above.	
										Grey SAND, some as above.	
20	*				23	Wt				Grey SAND, slight product odor.	20.5'
						Wt		ml		Grey SILT; 10% fine sand, firm, low plasticity.	
										Grey SILT, non plastic, some as above; no product odor.	
25										BOTTOM OF BORING = 24.0 FEET	
30											
35											

DRILLING CO.: G. TECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE.  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-15-99	APPROVED BY		DATE	

COP0020788

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-HP-3			
										COORDINATES N _____ E _____			
										FIELD GEOLOGIST	N.W.H.	DATE BEGAN	11-05-98
										CHECKED BY	N.W.H.	DATE FINISHED	
										APPROVED BY		GROUND SURFACE EL.	
										TOTAL DEPTH	28.0'		
										DESCRIPTION			
0										ml	ROCK	.5'	
										ml	Brown SANDY SILT, 20% medium sand, 10% fine sand.	1.5'	
										sm	Brown silty SAND: 20% coarse; 50% medium; 20% fine; 10% silt; no product odor.	3.0'	
5										ml	Brown sandy SILT, non plastic, no product odor, 10% very fine sand, trace mica.		
											Some as above. Slight product odor.	6.5'	
					9						Brown SAND: 10% coarse, 20% medium; 60% fine; 10% silt.		
10		*			13	Mst				sm	Some as above. Slight product odor.		
		*			8	Wt							
					13	Wt				ml	Grey SANDY SILT; 15% very fine sand.	12.5'	
15		*				Wt					Grey SAND: 30% coarse; 35% medium; 30% fine; 5% silt; moderate product odor.	13.0'	
						Wt				sm	Grey SAND; some as above; slight product odor.		
20						Wt					Grey SAND; with organics; 20% coarse; 50% medium; 20% fine; 5% silt, 5% fine gravel, wood, organic debris. Block silty SAND; same as above.	22.5'	
						Wt				ml	Grey sandy SILT, 15% fine sand, non plastic, no product odor.		
25						Wt					Grey sandy SILT. Grading (color).	25.5'±	
						Mst				ml	Brown SANDY SILT: 5% fine; orange, mottled; low plasticity, no product odor; no mica; firm; dry.		
30										BOTTOM OF BORING = 28.0 FEET			
35													

DRILLING CO.: C. TECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE.  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-15-99	APPROVED BY			

COP0020789

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-HP-4			
										COORDINATES			
										FIELD GEOLOGIST	N.W.H.	DATE BEGAN	11-04-98
										CHECKED BY	N.W.H.	DATE FINISHED	
										APPROVED BY		GROUND SURFACE EL.	
										TOTAL DEPTH	28.0'		
										DESCRIPTION			
0								gw		ROCK			
								gm		Rock/Sand fill; mica laminar.	1.5'		
										Brown silty SAND; 5% silt; 40% coarse; 40% medium; 15% fine.	2.0'		
5								sm		Fine silty brown SAND; 50% fine sand; 5% medium sand; 40% silt; micaceous.			
		*			8								
10								ml		Grey sandy SILT.	11.5'		
		*			1					Grey sandy SILT; 15% fine sand; low plasticity; no product odor.			
15								sm		Grey silty SAND; 30% coarse; 25% medium; 40% fine; 5% silt.	14.0'		
								ml		Grey sandy SILT; 15% fine sand; low plasticity; no product odor.	16.0'		
20								sm		Grey silty SAND; (slight product odor); 30% coarse; 25% medium; 40% fine; 5% silt.	18.0'		
		*			4					Grey silty SAND; 10% silt; 40% medium 30% coarse; 20% fine.			
25								ml		Grey sandy SILT.	23.5'		
										Grey sandy SILT; 5% fine sand.			
										Non plastic; root traces; organics; no product odor; with mica.			
30								BOTTOM OF BORING = 28.0 FEET					
35													

DRILLING CO.: G. TECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE. (NEAR SCALE)  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-15-99	APPROVED BY			

COP0020790

BORING NO. GATX-HP-5			
COORDINATES <sup>N</sup> _____ <sub>E</sub> _____			
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>11-02-98</u>		CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>11-02-98</u>	
APPROVED BY _____		GROUND SURFACE EL. _____	
TOTAL DEPTH <u>32.0</u>			
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	DESCRIPTION
	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT
DRILLING REMARKS			
USCS	PROFILE		
			ASPHALT
			1.0
gw			Crushed ROCK roadbed
			2.5
sm			Coarse brown SILTY SAND; poorly sorted; 10% silt.
			6.5
ml			Stiff brown SANDY SILT; 5% fine sand; grey mottle; no organics; no odor.
			SILT; as above; no odor.
			Brown SANDY SILT; 20% fine sand.
			Brown SILTY SAND; 15% fine sand; slight orange mottle; trace organics; no product odor.
			Brown SANDY SILT; 10% fine sand; trace mica; no product odor.
			Brown SILT; as above.
			Sandy brown SILT; 10% fine sand.
			SANDY SILT; 20% fine sand; coarser than above.
BOTTOM OF BORING = 32.0 FEET			

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: 61ST AVE. (GATX SIDE)  
 PROJECT NO.: B15-100.1A

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
DATE	10-05-99	APPROVED BY	DISK NUMBER



IT CORPORATION

COP0020791

				BORING NO. GATX-HP-6	
				COORDINATES $\begin{matrix} N \\ E \end{matrix}$	
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS
0				DRY	ASPHALT
					ROCK roadbed. 1.0
	*		220	MOIST	
5	*		48	MOIST	Brown SANDY SILT; 10% fine sand; trace charcoal and rootlets.
					As above, no organics
					Brown SANDY SILT; as above; no product odor.
10	*		49	WET	Stiff; brown; SANDY SILT; 20% fine sand; (trace mica flakes).
15					Loose brown SANDY SILT; as above.
					Grading less sand.
20				WET	Grading more sand.
					Brown SILTY SAND; 20% silt.
					Brown SANDY SILT; 10% fine sand; non-plastic; no product odors.
25				WET	Brown sandy SILT; loose; non plastic; 10% fine sand; no product odor.
				WET	Grading more fine sand.
30				WET	35% very fine SAND; mica flakes.
					Grading less SAND.
35					Stiff brown SANDY SILT.
					Brown SILTY SAND; 15% silt; no product odor. 35.0'

BOTTOM OF BORING = 36.0 FEET

DRILLING CO.: GEOTECH  
DRILLING METHOD: GEOPROBE  
SAMPLING METHOD: MACRO

PROJECT NAME:  
LOCATION: 61ST AVE.  
PROJECT NO.: B15-100.1A

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
DATE	10-05-99	APPROVED BY	



IT CORPORATION

COP0020792

BORING NO. GATX-HP-7									
COORDINATES <sup>N</sup> _____ <sub>E</sub> _____									
FIELD GEOLOGIST <u>N.W.H.</u>		DATE BEGAN <u>11-04-98</u>							
CHECKED BY <u>N.W.H.</u>		DATE FINISHED <u>11-04-98</u>							
APPROVED BY _____		GROUND SURFACE EL. _____							
TOTAL DEPTH <u>32.0'</u>									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0									ASPHALT 0.5
									Roadbed ROCK/SILT/SAND. 2.0
					MOIST				Brown SANDY SILT; 95% silt 5% sand with rootlets; organics and trace charcoal; non plastic; no product odor.
5	*		45		MOIST				Coarse brown SANDY SILT; 15% very fine sand; slight grey and orange mottle trace mica and organics.
	*		82		MOIST WET				Brown SANDY SILT; mica flakes 10% fine sand; 10% silt; non plastic; no product odor.
10									
	*		80		WET				Brown SANDY SILT; as above.
15									
					WET				Loose.
20					WET				
					WET				
25					WET				
					WET				Brown SANDY SILT 20% fine sand; non-plastic; no product odor.
30					WET				
									Brown SANDY SILT; 5% fine sand; trace mica flakes; non-plastic; no product odor.
BOTTOM OF BORING = 32.0 FEET									

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: 61ST AVE. & CULEBRA ST.  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	10-05-99	APPROVED BY			

COP0020793

BORING NO. GATX-HP-8									
COORDINATES $N$ $E$									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>11-04-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>11-04-98</u>									
APPROVED BY <u></u> GROUND SURFACE EL. <u></u>									
TOTAL DEPTH <u>32.0'</u>									
DESCRIPTION									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	
0					MOIST		gw		GRAVEL roodbed with silt and sand.
					MOIST		sm		2.0'
					MOIST				Brown silty SAND; 10% silt; poorly sorted.
	*		9		MOIST				3.5'
	*		34		WET				Dark brown SANDY SILT with 15% medium fine sand; with grey and orange mottle; non-plastic; trace organics.
	*		8		SAT		ml		Brown SILT with 10% fine sand; non plastic; no product odor.
					WET				Loose; brown SANDY SILT; 15% fine sand; non plastic; trace mica.
					WET				Trace organics; root traces.
					WET				
					WET				Brown SANDY SILT as above.
					WET				Brown SANDY SILT; 10% fine SAND; non plastic; no product odor.
					WET				Stiff grey SILT; 10% fine sand; non plastic; no product odor.
BOTTOM OF BORING = 32.0 FEET									

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: 61ST AVE. & CULEBRA  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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COP0020794



BORING NO. GATX-HP-9							
COORDINATES $\begin{matrix} N \\ E \end{matrix}$							
FIELD GEOLOGIST <u>N.W.H.</u>		DATE BEGAN <u>11-03-98</u>		CHECKED BY <u>N.W.H.</u>		DATE FINISHED <u>11-03-98</u>	
APPROVED BY _____		GROUND SURFACE EL. _____		TOTAL DEPTH <u>32.0</u>			
DESCRIPTION							
0						gw	1.25'
			MOIST				Dark brown SANDY SILT; 20% sand; with gravel and organics; non plastic; no product odor.
5			MOIST				Brown SANDY SILT; 5-10% fine sand; low plasticity; grey and orange mottle; no product odor.
	*	80	MOIST			ml	Brown SANDY SILT; as above.
10			WET				Loose; brown SANDY SILT; 10% very fine sand; 90% silt.
	*	350	SAT				Stiffer, moderate plastic; 5% sand (fine).
15							SILT; as above.
	*	320	WET				Brown SANDY SILT; 10% fine sand; trace mica flakes; non plastic; no product odor.
20			WET				Brown SANDY SILT; as above.
25			WET				Grades more sand.
30							
35							
BOTTOM OF BORING = 32.0 FEET							

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: CULEBRA AVE.  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
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COP0020795

				BORING NO. GATX-HP-10		
				COORDINATES $\begin{matrix} N \\ E \end{matrix}$		
				FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>11-04-98</u>		
				CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>11-04-98</u>		
				APPROVED BY _____ GROUND SURFACE EL. _____		
				TOTAL DEPTH <u>32.0'</u>		
				DESCRIPTION		
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY SAMPLE INTERVAL	P.I.O. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS PROFILE
0						gw
				MOIST		ml
5	*	6				
				WET		gw
10	*		13	WET		ml
15						
	*	5		WET		
20				WET		
25						
30						
35						

Crushed ROCK roadbed.  
ROCK mixed with silt and sand. 15'

Dark brown sandy SILT with charcoal; rootlets and 10% fine to medium sand.  
  
Non plastic, no odor.  
  
Brown SILT with fewer organics. 7.0'

Crushed drain ROCK with 20% brown silt and 10% sand; moderate product odor.  
  
Strong product odor, sheen on water. 12.0'

Stiff; brown SANDY SILT; 15% fine sand; orange mottle; trace mica; faint product odor.  
  
Grey SILT with trace sand; non plastic; moderate product odor.  
  
SILT; as above.  
  
Grey SANDY SILT; as above.  
  
Coarse brown SANDY SILT; loose; non-plastic; no product odor.  
  
Grey SANDY SILT; 20% fine sand; faint product odor.

BOTTOM OF BORING = 32.0 FEET

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: CULEBRA AVE.  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
DATE	10-06-99	APPROVED BY	

COP0020796







BORING NO. GATX-HS-1									
COORDINATES <u>N</u>									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-26-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED _____									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>12.0</u>									
DESCRIPTION									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	
0					Mst		gw		ROCK, no product odor. 0.5'
	*				Mst				Silty SAND, brown; 50% coarse, 20% fine; 20% medium, 10% silt.
					Wt		sm		Dark brown and black, poorly graded SAND, 15% fine sand, 75% medium sand, 50% coarse sand, 10% silt; slight product odor.
5	*								Sand as above.
									6.5'
									Grey sandy SILT; 15% fine sand, low plasticity, stiff, slight product odor.
10					Mst		ml		Some grey sandy SILT.
									Slight product odor at 12 feet, low plasticity.
									BOTTOM OF BORING = 12.0 FEET
15									
20									
25									
30									
35									

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: DIRECT PUSH  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TK 2/52 GATX SOUTH YARD  
 PROJECT NO.: B15-100.1A

DRAWN BY M.J.S. CHECKED BY \_\_\_\_\_

FILE NAME & \_\_\_\_\_



ITT CORPORATION

COP0020800

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-HS-2	
										COORDINATES $N$ $E$	
										FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-26-98</u>	
										CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>          </u>	
										APPROVED BY <u>          </u> GROUND SURFACE EL. <u>          </u>	
										TOTAL DEPTH <u>8.0</u>	
										DESCRIPTION	
0								qw	0.00	ROCK	0.5'
		*			329	Mst				SAND: dark brown; grading downward to block; poorly sorted; 50% coarse; 30% medium to fine; 20% silt.	
					244	Wl		sw			
		*				Wl				$\nabla$ Block SAND, strong odor.	
5										BOTTOM OF BORING = 4.0 FEET	
10											
15											
20											
25											
30											
35											

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: DIRECT PUSH  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TK 2/S2 GATX SOUTH YARD  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &
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COP0020801

# BORING NO. GATX-HS-3

COORDINATES N

FIELD GEOLOGIST N.W.H. DATE BEGAN 10-26-95  
 CHECKED BY N.W.H. DATE FINISHED \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_ GROUND SURFACE EL. \_\_\_\_\_  
 TOTAL DEPTH 8.0'

## DESCRIPTION

0.5'	ROCK
	Dark brown SAND; poorly sorted; 40% coarse; 30% medium; 20% fine; 10% silt.
	Black SAND; few quartz grains (white); 50% coarse; 20% medium; 15% fine; 15% silt.
	Strong product odor.
6.5'	Grey SILT; 90% silt; 10% fine sand; no mottling or root traces; stiff; low plasticity.

BOTTOM OF BORING = 8.0 FEET

DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE
0							gw	0.0'
	*			59	Mst			
	*			141	Wt		sm	
5								
					Mst		mf	
10								
15								
20								
25								
30								
35								

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TK 2/52 GATX SOUTH YARD  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	8-02-99	APPROVED BY		DISK NUMBER	

COP0020802



DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.O. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. GATX-HS-4	
										COORDINATES <sup>N</sup> E	
										FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-26-98</u>	
										CHECKED BY <u>N.W.H.</u> DATE FINISHED _____	
										APPROVED BY _____ GROUND SURFACE EL. _____	
										TOTAL DEPTH <u>8.0'</u>	
										DESCRIPTION	
0								gw	0.5'	GRAVEL	
		*			6	Mst				Brown, poorly graded SAND; 50% coarse; 25% medium; 15% fine sand; 10% silt; no product odor.	
		*			59	Wl		sp		Faint product odor.	
5										SAND: 50% coarse; 25% medium; 15% fine; 10% silt.	
						Mst				Free product; thin consistency, filling 10-20% of pores; grey SILT, 10% fine sand, low plasticity, petroleum hydrocarbons.	
10										BOTTOM OF BORING = 8.0 FEET	
15											
20											
25											
30											
35											

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: PUSH PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TK 2/52 GATX SOUTH YARD  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	8-02-99	APPROVED BY		INSTR. NUMBER	

COP0020803

**COP0020804**


DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/8")		RECOVERY SAMPLE INTERVAL		P.I.D. (ppm)		MOISTURE CONTENT		DRILLING REMARKS		USCS		PROFILE		BORING NO. TOS-HP-2		COORDINATES		FIELD GEOLOGIST N.W.H. DATE BEGAN 11-03-98		CHECKED BY N.W.H. DATE FINISHED		APPROVED BY GROUND SURFACE EL.		TOTAL DEPTH 28.0'	
0																Asphalt											
																Road gravel.										2.0'	
												rnl				Grey SILT, low plasticity, no sand, no product odor.										2.75'	
																Grey SAND; 20% fine, 50% medium, 25% coarse, 5% silt.											
5																Grey SAND; some as above.											
																No sheen on water; no product odor.											
10																SAND; grey, silty, 5% silt; slight product odor; 20% fine, 50% medium, 25% coarse.											
																No sheen on water.											
15																Moderate product odor.											
																SAND, grey, some as above.											
																Sheen on water.											
20																Grey SAND; some as above.											
25																Grey brown SAND; 20% coarse; 50% medium; 75% fine; 5% silt.											
																SAND; some as above.											
30																No product odor; no sheen on water.											
																										28.5'	
35																Grey sandy SILT; non-plastic; 5% very fine sand; no product odor.											
																Harder.											
																Brown silt; 5% fine sand, dense.											
																Grey SILT; non-plastic; 5% fine sand; no product odor.											
																As above with grey brown mottling.											

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE.  
 PROJECT NO.: B15-300.1A

BOTTOM OF BORING = 36.0 FEET

DRAWN BY M.J.S. CHECKED BY

FILE NAME &



ITT CORPORATION

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (opm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-HP-3			
										COORDINATES $\begin{matrix} N \\ E \end{matrix}$			
										FIELD GEOLOGIST	N.W.H.	DATE BEGAN	11-04-98
										CHECKED BY	N.W.H.	DATE FINISHED	
										APPROVED BY		GROUND SURFACE EL.	
										TOTAL DEPTH	32.0		
										DESCRIPTION			
0										ASPHALT			
										Road gravel.			
										Brown silty SAND; 50% fine sand; 20% medium sand; 10% coarse sand; 20% silt; sheen on water, no product odor.			
5								sm		Brown silty SAND; 30% coarse; 55% fine to medium 15% silt; sheen on water; no product odor.			
					105								
						Mst							
10													
						Mst				No sheen on water; no product odor.			
										Grey silty SAND; 20% coarse; 40% medium; 25% fine; 15% silt.			
		*			138								
15								sm		Sheen on water; strong product odor.			
										Grey silty SAND; 15% coarse; 20% medium; 45% fine; 20% silt, silt lenses 1/4"; strong product odor.			
20		*			395	Wt							
						Wt							
										Grey silty SAND; 20% coarse; 40% medium; 25% fine; 5% silt; no sheen; no product odor.			
		*			27					Grey silty SAND; some as above.			
25										Slight product odor, slight sheen; grey silty SAND; some as above.			
						Wt							
										Grey silty SAND; 30% silt.			
										Grey silty SAND; some as above.			
											28.5'		
30								ml		Grey sandy SILT; 20% fine sand; non-plastic.			
										Grey sandy SILT; 10% fine sand; no product odor; no sheen; low plasticity; root traces/organics; no mica.			
										BOTTOM OF BORING = 32.0 FEET			

DRILLING CO.: G. TECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE.  
 PROJECT NO.: B15-300.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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COP0020806

				BORING NO. TOS-HP-4	
				COORDINATES <u>N</u>	
				FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>11-03-98</u>	
				CHECKED BY <u>N.W.H.</u> DATE FINISHED _____	
				APPROVED BY _____ GROUND SURFACE EL. _____	
				TOTAL DEPTH <u>32.0'</u>	
				DESCRIPTION	
0				ASPHALT	0.5'
				Rock/soil roadbed.	1.5'
				Brown silty SAND; 60% fine sand; 10% medium sand; 30% silt.	
				Brown silty SAND; 20% coarse; 50% medium; 20% fine; 10% silt; no product odor.	
				Brown silty SAND; 20% coarse; 15% fine; 30% medium; 15% silt; no product odor.	
				Brown silty SAND; 50% fine; 15% medium 15% coarse; 20% silt.	
				3" grey SILT; no sand; moderately plastic; wet; no product odor.	14.0'
				Brown silty SAND; 40% coarse; 30% medium; 20% fine; 10% silt.	15.0'
				Depth to water approximately 18.4 ft.	
				Brown SAND; 20% coarse; 60% medium; 15% fine; 5% silt.	
				Gravel .25"	
				Brown sand; 5% silt.	
				Same as above; no product odor.	
				Grey SAND; 30% coarse; 50% medium; 20% fine; trace silt.	
				Grey SAND; same as above.	
				Strong contact with grey SILT; some organics (wood).	30.0'
BOTTOM OF BORING = 32.0 FEET					

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE.  
 PROJECT NO.: B15-300.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-15-99	APPROVED BY		DISK NUMBER	

COP0020807

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-HP-5	
										COORDINATES N _____ E _____	
0										FIELD GEOLOGIST _____ N.W.H. DATE BEGAN 10-14-98	
										CHECKED BY _____ N.W.H. DATE FINISHED 10-14-98	
										APPROVED BY _____ GROUND SURFACE EL. _____	
										TOTAL DEPTH 16.0'	
										DESCRIPTION	
0									gm	Crushed ROCK roadbed.	
2.0'										Brown SILTY SAND; medium; grain size with 20% silt.	
5		*			700	MOIST			sm	Grey SILTY SAND (stained) 20% silt; grading finer; strong product odor.	
5.75'									ml	Grey SILT; with 20% fine sand.	
6.5'									ml		
10		*			5.0	MOIST SAT				Brown SANDY SILT with 15% fine sand; non-plastic; no product odor.	
										Stiff; grey-brown SILT; 10% fine sand; no product odor.	
15		*			5.5	SAT				Stiff; grey SILT; with 10% fine sand with grey and orange mottle; low plasticity.	
20										Grey SANDY SILT; as above.	
						SAT				No recovery.	
25						SAT				Grey SANDY SILT; as above.	
										Tan SILT; 10% fine sand.	
30										BOTTOM OF BORING = 28.0 FEET	
35											

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: NEAR BNSF RAIL  
 PROJECT NO.: B15-300.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	10-05-99	APPROVED BY			



IT CORPORATION

COP0020808

BORING NO. TOS-HP-6									
COORDINATES N _____ E _____									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-14-98</u> CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-14-98</u> APPROVED BY _____ GROUND SURFACE EL. _____ TOTAL DEPTH <u>28.0'</u>									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0									ASPHALT 0.5'
							gw		GRAVEL roadbed with sand and sil. 2.5'
5	*			6	MOIST		sm		Brown SILTY SAND with 10% sil, angular fill; sand; no product odor.
10					MOIST				
	*			35					SAND as above. 12.0'
15					WET		ml		Light grey CLAYEY SILT with 10% fine sand; block and orange mottle; moderate plasticity; no product odor.
20									
									Loose; coarse brown SILT to very fine sand; 15% fine sand; non plastic.
25									Stiff grey SANDY SILT.
	*			19	SAT				Stiff; tan SILT; with 10% fine sand; low plasticity; no product odor.
30									BOTTOM OF BORING = 28.0 FEET
35									

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: BEHIND TOSCO WAREHOUSE  
 PROJECT NO.: B15-300.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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IT CORPORATION

COP0020809

BORING NO. TOS-HP-7									
COORDINATES $\begin{matrix} N \\ E \end{matrix}$									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-14-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-14-98</u>									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>24.0</u>									
DESCRIPTION									
ASPHALT 0.5'									
Brown SILTY SAND; 20% sand, grading less sand; non-plastic; no product odor. 1.0'									
2.0'									
Brown SANDY SILT; with high organic content; roots and organic debris; grey and black mottle.									
Brown SANDY SILT; as above; fewer organics.									
Grey SANDY SILT with mica; trace organics; 5% fine sands.									
Brown SANDY SILT; 5% fine sand; low plasticity.									
Grey SANDY SILT; 10% fine sand; no odor or sheen. Brown SANDY SILT; 01-15% fine sand. Grading coarser.									
Stiff grey SANDY SILT; no product odor.									
Stiff gray SILT; 10% fine sand; low plasticity; no odor.									
BOTTOM OF BORING = 24.0 FEET									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	
0							qw		
							sm		
5	*			7.5	MOIST				
					MOIST				
10	*			15.5	WET				
					SAT		ml		
15	*								
20									
25									
30									
35									

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEOPROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TRUCK LOADING/DOANE AVE.  
 PROJECT NO.: B15-300.1A



ITT CORPORATION

DRAWN BY M.J.S. CHECKED BY \_\_\_\_\_ FILE NAME & \_\_\_\_\_

COP0020810



DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-HS-1	
										COORDINATES <sup>N</sup> _____ <sub>E</sub> _____	
										FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-27-98</u>	
										CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-27-98</u>	
										APPROVED BY _____ GROUND SURFACE EL. _____	
										TOTAL DEPTH <u>16.0'</u>	
										DESCRIPTION	
0								gw	0.5'	Crushed ROCK with sand. 0.5'	
5	*				3	MOIST				Brown SILTY SAND; 50% coarse; 10% medium; 10% fine sand; 20% silt; no product odor.	
10	*				18	MOIST		sm		Some brown SAND; no product odor.	
15	*				78	MOIST				SAND as above; less silt; moderate product odor.	
20										Grading darker	
25										Grey-black SAND.	
30										Dark grey SAND; as above; faint product odor.	
35	*				84	WET				BOTTOM OF BORING = 16.0 FEET	

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: TRIPOD/HAMMER  
 SAMPLING METHOD: MACRO  
 PROJECT NAME: \_\_\_\_\_  
 LOCATION: NEAR TK 3411  
 PROJECT NO.: B15-300.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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COP0020811

BORING NO. TOS-HS-2						
COORDINATES $\begin{matrix} N \\ E \end{matrix}$						
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-27-98</u> CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-27-98</u> APPROVED BY _____ GROUND SURFACE EL. _____ TOTAL DEPTH <u>16.0'</u>						
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS PROFILE
0						g
						sm
5				MOIST		
10	*		<18	MOIST		
15	*		128	WET		
16.0						
DESCRIPTION ROCK/SAND 0.5' Brown SILTY SAND; 20% silt; gravel. No product odor. Brown SILTY SAND; as above; slight product odor. Color Variable; brown to grey; moderate product odor. Moderate product odor. Grey SILTY SAND; as above; strong product odor (gasoline). BOTTOM OF BORING = 16.0 FEET						

DRILLING CO.: CRISSMAN  
 DRILLING METHOD: TRIPOD/HAMMER  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: NEAR TK 3411  
 PROJECT NO.: B15-300.1A

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
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IT CORPORATION

COP0020812

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-HS-3	
										COORDINATES <sup>N</sup> E	
										FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-27-98</u>	
										CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>10-27-98</u>	
										APPROVED BY _____ GROUND SURFACE EL. _____	
										TOTAL DEPTH <u>16.0'</u>	
										DESCRIPTION	
0								gw	0.5'	ROCK/SAND	
						Mst				Brown SAND, 40% coarse 40% medium; 10% fine; 10% silt, no product odor.	
5					28					Grades to grey silty SAND at 4 ft.	
						Mst				Slight product odor.	
										Brown silty SAND; 10% silt, 50% coarse, 30% medium, 10% fine.	
10					31			sm		Moderate product odor.	
						Mst				Sand; some as above.	
		*			28					Brown SAND; some as above.	
15						Mst					
		*			65	Wt			$\nabla$	Dark grey SAND; strong product odor.	
TOTAL DEPTH = 16.0 FEET											
20											
25											
30											
35											

DRILLING CO.: CRISMAN  
 DRILLING METHOD: PROBE TRIPOD  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TANK 3411  
 PROJECT NO.: B15-300.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-14-99	APPROVED BY		DATE	



IT CORPORATION

COP0020813

				BORING NO. TOS-HS-4		
				COORDINATES $\begin{matrix} N \\ E \end{matrix}$		
				FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>11-05-98</u>		
				CHECKED BY <u>N.W.H.</u> DATE FINISHED <u>11-05-98</u>		
				APPROVED BY <u></u> GROUND SURFACE EL. <u></u>		
				TOTAL DEPTH <u>20.0</u>		
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS
0						
					Mst	
					Mst	
5					Mst	
				92	Mst	
	*				Mst	
15	*			61	Wt	
	*			134		
					Wt	
20						
25						
30						
35						

USCS	PROFILE	DESCRIPTION
gw	000	ROCK
		Brown silty SAND: 30% coarse, 20% medium, 40% fine, 10% silt.
		Thin silt layer, brown sandy SILT, 10% fine sand.
		Brown silty SAND, 30% coarse, 30% medium, 30% fine, 10% silt.
		No product odor.
		Slight product odor.
		Slight product odor.
sm		Brown SILTY SAND (same as above).
		Moderate product odor.
		Brown SILTY SAND, same as above, moderate product odor.
		Strong product odor.
		Grey silty SAND, same as above.
		Block SILTY SAND; 30% coarse; 30% medium, 20% fine.
ol		SILT; grey, 50% organics (roots).
ml		Grey sandy SILT: 10% coarse sand; trace fine gravel; slight product odor, low plasticity, organics.

TOTAL DEPTH = 20.0 FEET

DRILLING CO.: GEO-TECH  
 DRILLING METHOD: GEO PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TANK 3411  
 PROJECT NO.: B15-300.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-14-99	APPROVED BY			

COP0020814

BORING NO. TOS-LS-1									
COORDINATES <span style="float: right;">N _____ E _____</span>									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-13-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED _____									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>20.0'</u>									
DESCRIPTION									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	
0							gw		Rock/Sand Rock bed/gravel and sand.
					Mst				2.0'
5							sm		Medium brown SAND, poorly sorted; silty SAND ~15% silt.
				2.0	Mst				Coarse silty SAND; 30% silt; no product odor.
10							ml		11.0'
									Grey sandy SILT; moderate plasticity, moist; 5% fine sand; black and grey; slight mottle; moderate product odor.
									BOTTOM OF BORING = 12.0 FEET
15									
20									
25									
30									
35									

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TOSCO BEACH  
 PROJECT NO.: B15-300.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-27-99	APPROVED BY		DISK NUMBER	

COP0020815

# BORING NO. TOS-LS-2

COORDINATES

FIELD GEOLOGIST N.W.H. DATE BEGAN 10-14-98  
 CHECKED BY N.W.H. DATE FINISHED \_\_\_\_\_  
 APPROVED BY \_\_\_\_\_ GROUND SURFACE EL. \_\_\_\_\_  
 TOTAL DEPTH 16.0'

## DESCRIPTION

DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0							gw		Ballast Rock
2.0'					Mst				Rock/Roadbed/brick, sand, clay, mixed.
5					Mst		sm		Brown, poorly sorted, silty SAND, non plastic, no odor.
9.0'					Mst				Brown silty SAND, 70% coarse grains; 10% silt; 20% fine sand, no product odor. Product odor; very faint.
15					Wt		ml		Sandy grey SILT; 10% fine sand, 90% silt; no product odor (wet). Slight product odor; grey SILT; some as above.
20									BOTTOM OF BORING = 20.0 FEET
25									
30									
35									

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TOSCO BEACH, UPPER  
 PROJECT NO.: B15-300.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-27-99	APPROVED BY		DISK NUMBER	

COP0020816

DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-LS-3	
									COORDINATES	
0									FIELD GEOLOGIST	N.W.H. DATE BEGAN 10-29-98
									CHECKED BY	N.W.H. DATE FINISHED
									APPROVED BY	GROUND SURFACE EL.
									TOTAL DEPTH	12'
									DESCRIPTION	
							sw		SAND	1.0'
							sm		SAND	2.0'
									Brown SILT, 3% fine sand, block mottle, non plastic, no product odor.	
									Brown SILT; grey mottle; moderate plasticity; no product odor.	
							ml			
									Brown SILT; some as above, 5% fine sand.	
									BOTTOM OF BORING = 12 FEET	

DRILLING CO.: CRISMAN  
 DRILLING METHOD: PUSH PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: NEAR P1  
 PROJECT NO.: B15-300.1A



ITT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-28-99	APPROVED BY			

COP0020817





DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-LS-5	
										COORDINATES $\begin{matrix} N \\ E \end{matrix}$ _____	
										FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-29-98</u>	
										CHECKED BY <u>N.W.H.</u> DATE FINISHED _____	
										APPROVED BY _____ GROUND SURFACE EL. _____	
										TOTAL DEPTH <u>16'</u>	
										DESCRIPTION	
0								gc		Rock blanket.	.05'
										SAND, silty, brown, no product odor.	
					6						
					12	Mst		sm		Brown, silty SAND, same as above.	
5						Mst				Slight product odor at 4 feet.	
						Wl					
					178					Wet silty SAND.	6.5'
										SILT, grey, 10% fine sand, low plasticity, slight product odor.	
										Strong product odor, low plasticity.	
10								ml		Grey sandy SILT, some as above, low plasticity, strong product odor.	
										Grey SILT, some as above, moderate product odor.	
15					28						
BOTTOM OF BORING = 16.0 FEET											

DRILLING CO.: CRISMAN  
 DRILLING METHOD: PUSH PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TOSCO BEACH  
 PROJECT NO.: B15-300.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-29-98	APPROVED BY		DISK NUMBER	

COP0020819

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-LS-6	
										COORDINATES	
0										FIELD GEOLOGIST <u>N.W.H.</u>	DATE BEGAN <u>10-29-98</u>
										CHECKED BY <u>N.W.H.</u>	DATE FINISHED
										APPROVED BY	GROUND SURFACE EL.
										TOTAL DEPTH <u>16'</u>	
										DESCRIPTION	
0								gm		Rock Surface.	1.0'
						Mst				SAND, brown, silty, 40% coarse, 80% medium, 30% fine.	
5						Mst		sm		SAND, brown, same as above.	
					25	Wt				Slight product odor, same as above, very faint.	
10						Wt				$\frac{V}{-}$ Fine silty SAND, 60% fine sand, 40% silt, slight product odor.	10.0'
					9					Fine grey SILT, sandy, moderate plasticity, 10% fine sand; slight product odor.	
15					10			ml			
										SILT, same as above with organic (root traces).	
BOTTOM OF BORING = 16.0 FEET											
20											
25											
30											
35											

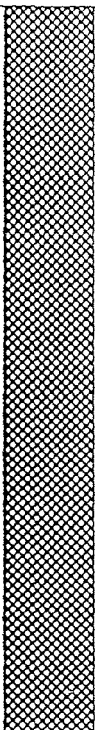
DRILLING CO.: CRISMAN  
 DRILLING METHOD: PUSH PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TOSCO BEACH  
 PROJECT NO.: B15-300.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-29-99	APPROVED BY		FILE NUMBER	



ITT CORPORATION

COP0020820

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.L.O. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-RF-1	
										COORDINATES N _____ E _____	
										FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-12-98</u> CHECKED BY <u>N.W.H.</u> DATE FINISHED _____ APPROVED BY _____ GROUND SURFACE EL. _____ TOTAL DEPTH <u>16'</u>	
										DESCRIPTION	
0		*			0	Mst		sw		SAND: beach sand, <5% silt; 95% fine to medium sand.	1.0'
								sm		Silty SAND; 10% silt; 90% fine sand; brown. Grey silty SAND; 30% silt; 70% coarse sand; non plastic.	
5								ml		Grey, clayey SILT; 90% silt; 10% clay; moderate plasticity.	6.0'
		*						sm		Grey silty SAND; 40% silt; 60% fine sand; low plasticity.	6.5'
								ml		Sandy SILT; 10% sand.	8.0'
		*				Wt		sm		2" red silty SAND, red/orange, rust colored.	8.5'
10										Grey sandy SILT; 5% sand; fine orange spotting; mottled sand.	9.0'
		*			0			ml		Fine grey sandy SILT; 5% fine sand; small amount of black and orange mottle; low plasticity; wet.	
15											
BOTTOM OF BORING = 16.0 FEET											

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: WILBRIDGE  
 PROJECT NO.: B15-300.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	7-27-99	APPROVED BY		DISK NUMBER	

COP0020821

BORING NO. TOSCO-RF-2									
COORDINATES $N$ _____ $E$ _____									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>10-13-98</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED _____									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>20.0'</u>									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0							gw		Gravel ballast.
2.0'					Mst		sm		SAND; low quartz; grayish brown; mixed color with brown, 15% silt; poorly sorted, non plastic, no odor.
8.0'	*		2.0				ml		Grey with some brown mottle SILT, grey, no sand, no odor.
15	*		3.0		Mst				Grey SILT; low plasticity.
20									BOTTOM OF BORING = 20.0 FEET
25									
30									
35									

DRILLING CO.: GEOTECH  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: TOSCO BEACH  
 PROJECT NO.: B15-300.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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COP0020822

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-UB-1	
										COORDINATES N _____ E _____	
0										FIELD GEOLOGIST <u>N.W.H.</u>	DATE BEGAN <u>3-31-99</u>
										CHECKED BY <u>N.W.H.</u>	DATE FINISHED _____
										APPROVED BY _____	GROUND SURFACE EL. _____
										TOTAL DEPTH <u>32.0'</u>	
										DESCRIPTION	
1.0'										ASPHALT	
2.5'								gw		COBBLES; 2-3" .	
5'						Mst				Brown SAND; 65% medium; 35% fine; < 5% silt; no product odor.	
10'		*			0	Mst		sw		SAND; 90% sand; 10% gravel.	
15'		*			0	Wl Sat				SAND WITH SILT; 80% sand as above; 20% silt; no product odor.	
14.5'								ml		CLAYEY SILT; 5% fine sand; no product odor.	
15.5'										Brown SAND (as above). SAND with 20% gravel fine to coarse.	
20'		*			0	Sat		sw		Brown SAND (as above).	
										BOTTOM OF BORING = 20 FEET	
25'											
30'											
35'											

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: FRONT AVE.  
 PROJECT NO.: B15-300.1A




IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-15-99	APPROVED BY		DISK NUMBER	

COP0020823

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-UB-2			
										COORDINATES			
										FIELD GEOLOGIST	N.W.H.	DATE BEGAN	3-3-99
										CHECKED BY	N.W.H.	DATE FINISHED	
										APPROVED BY		GROUND SURFACE EL.	
										TOTAL DEPTH	32.0'		
										DESCRIPTION			
0								sw	Gravel	1.0'			
									Brown SAND: fine to medium; 60% medium; 80% fine; trace organics.				
5						Mst							
	*			0					Rootlets; no product odor.				
10						Dp		sw	Rootlets.				
						Mst							
15	*			0		Sat			Grading to grey sand, some.	16.5'			
									Dark grey SAND; 0-10% silt; no product odor.				
20	*			10		Sat		sm	Reddish brown SAND; 15% silt.				
									Grey SAND.				
	*			140		Sat			Dark grey to black SAND; faint product odor.				
25									BOTTOM OF BORING = 24.0 FEET				
30													
35													

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: WILLBRIDGE 54" SANITARY SEWER  
 PROJECT NO.: B15-300.1A

  
**IT CORPORATION**

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-16-99	APPROVED BY		DISK NUMBER	

DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-UB-3	
										COORDINATES $\begin{matrix} N \\ E \end{matrix}$	
										FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>3-31-99</u>	
										CHECKED BY <u>N.W.H.</u> DATE FINISHED _____	
										APPROVED BY _____ GROUND SURFACE EL. _____	
										TOTAL DEPTH <u>12.0</u>	
										DESCRIPTION	
0						Dp				▽ ASPHALT	1.0'
						Wt/Mst		gm		Rock and sand roadbed; large round rock with sand matrix.	2.0'
		*		0.5		Mst				▽ Very fine SAND with 10-15% silt; brown.	
5		*			0	Mst				Very fine sand as above.	
		*				Wt		sp		Very fine sand; grading looser; brown; no product odor.	
						Wt				Brown sand; medium grained.	
10						Sat				▽ Dark grey, black sand with 5% silt; occasional pebbles; heavy sheen; diesel odor; (no pebbles) some as above; slight product odor. Depth to water 9.1' below ground surface after sampling.	11.0'
		*		100		Sat		ml		Stiff; dark brown; grey silt, low plasticity; occasional rootlets.	
15										▽ BOTTOM OF BORING = 12.0 FEET	
										Water at 12.45 feet.	
20											
25											
30											
35											

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: WILLBRIDGE/SANSERVER  
 PROJECT NO.: B15-100.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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IT CORPORATION

COP0020825

BORING NO. TOS-UB-4									
COORDINATES $N$ $E$									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>3-31-99</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED <u></u>									
APPROVED BY <u></u> GROUND SURFACE EL. <u></u>									
TOTAL DEPTH <u>12.0'</u>									
DESCRIPTION									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	
0									ASPHALT
							gw		GRAVEL; graded river rock.
									1.0'
									2.0'
							sw	$\nabla$	SAND; clean, coarse grey with red and clear quartz grains; 20% quartz coarse.
	*			0					Sand as above.
							ml		Silt lense; 2" thick.
									7.0'
							sw		7.5'
	*			0					
							ml		Brown silt with 5-10% fine sand.
									9.0'
10							sm		Black SAND, strong product odor (diesel) many wood fragments and trace gravel.
	*			145					10.0'
BOTTOM OF BORING = 12.0 FEET									
15									
20									
25									
30									
35									

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:  
 LOCATION: WILLBRIDGE/SANSERVER  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-16-99	APPROVED BY			

COP0020826



DEPTH IN FEET		SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	BORING NO. TOS-UB-5	
									COORDINATES N _____ E _____	
									FIELD GEOLOGIST N.W.H. DATE BEGAN 4-1-99	
									CHECKED BY N.W.H. DATE FINISHED _____	
									APPROVED BY _____ GROUND SURFACE EL. _____	
									TOTAL DEPTH 12.0'	
									DESCRIPTION	
0							ml	ASPHALT	1.0'	
					Dry		qw	ROCK (roadbed)	2.0'	
					Mst		sm	Brown silty SAND; 20% silt; no product odor.		
5	*	140			Mst			Grey green sandy SILT; very fine sand; faint product odor.	4.5'	
	*	185			Wt		ml	SILT (as above).		
10					Wt			Rootlets, wood, organics, no sheen, moderate product odor.		
	*	177			Wt					
BOTTOM OF BORING = 12.0 FEET										
15										
20										
25										
30										
35										

DRILLING CO: CASCADE  
 DRILLING METHOD: HAND AUGER  
 SAMPLING METHOD: BRASS TUBE  
 PROJECT NAME:  
 LOCATION: 10" WOOD USP? ABANDONED  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
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COP0020827

BORING NO. TOS-UB-6									
COORDINATES <sup>N</sup> _____ <sub>E</sub> _____									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>3-31-99</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED _____									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>12.0'</u>									
DESCRIPTION									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	
0							ml		ASPHALT 12"
					Dp				1.0'
					Dp		gw		Coarse clean dark grey SAND with rock (roadbed).
					Mst				2.5'
5					Mst		sw		Brown to grey SAND; 10% coarse; 60% medium; 25% fine; trace s&lt.
	*			0	Mst				SAND as above.
	*				Wt				10.0'
10	*			0	Wt		gw		SAND with fine to coarse gravel (fil). GRAVEL, fine, no product odor. Hard object at 11.8 feet.
									BOTTOM OF BORING = 12 FEET
15									
20									
25									
30									
35									

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:

LOCATION: STORM IN N. BOARD FRONT  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
DATE	6-16-99	APPROVED BY	DISK NUMBER

COP0020828

BORING NO. TOS-UB-7									
COORDINATES $\begin{matrix} N \\ E \end{matrix}$									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>4-1-99</u> CHECKED BY <u>N.W.H.</u> DATE FINISHED _____ APPROVED BY _____ GROUND SURFACE EL. _____ TOTAL DEPTH <u>20.0'</u>									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6')	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0									ASPHALT Gray 1.0'
									Brown SAND with silt; 85% fine to medium sand with 15% silt no product odor.
5	*			0	Dp		sm	$\frac{V}{X}$	Very fine brown SAND WITH SILT; 80% sand; 20% silt; no product odor.
	*			1	Mst		ml		SILT WITH SAND; brown, low plasticity silt, with 15% fine sand; no product odor. 7.5'
10					Wt		sm		Grading to SILTY SAND. SAND WITH SILT; brown. 9.5'
					Wt		ml		Sandy SILT; 60% silt; 40% fine sand; brown, non-plastic; no product odor. 11.0'
15	*			15			sm		Silty SAND; 5% silt. 13.0'
					Wt				SAND; block; 15% silt; fine gravel; no product odor.
20									FILL
									Block SAND; 10% coarse; 35% medium; 55% fine; trace fine gravel; faint product odor or organics.
TOTAL DEPTH = 20.0 FEET									
25									
30									
35									

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME:

LOCATION: 60" SANITARY GS LOT  
 PROJECT NO.: B15-100.1A

DRAWN BY	M.J.S.	CHECKED BY		FILE NAME &	
DATE	6-18-99	APPROVED BY		DISK NUMBER	



IT CORPORATION

COP0020829

BORING NO. TOS-UB-8									
COORDINATES $\begin{matrix} N \\ E \end{matrix}$ _____									
FIELD GEOLOGIST <u>N.W.H.</u> DATE BEGAN <u>4-1-99</u>									
CHECKED BY <u>N.W.H.</u> DATE FINISHED _____									
APPROVED BY _____ GROUND SURFACE EL. _____									
TOTAL DEPTH <u>16.0'</u>									
DEPTH IN FEET	SAMPLE NUMBER PENETRATION (BLOWS/6")	RECOVERY	SAMPLE INTERVAL	P.I.D. (ppm)	MOISTURE CONTENT	DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0									ASPHALT 0.5'
									Brown medium to fine SAND; no product odor.
5					Mst				
					Mst				
	*			0	Mst		sm		
					Wt				Brown SAND; 80% fine sand; 15% very fine sand; 5% silt; no product odor.
10	*			0.5					Brown SAND; as above, no product odor.
					Sat				Brown SAND; as above.
15	*			0	Sat				Dark brown SAND as above; no product odor.
BOTTOM OF BORING = 16.0 FEET									
20									
25									
30									
35									

DRILLING CO.: CASCADE  
 DRILLING METHOD: GEO-PROBE  
 SAMPLING METHOD: MACRO  
 PROJECT NAME: \_\_\_\_\_  
 LOCATION: 60" SANITARY  
 PROJECT NO.: B15-100.1A



IT CORPORATION

DRAWN BY	M.J.S.	CHECKED BY	FILE NAME &
DATE	6-20-99	APPROVED BY	FILE NUMBER

COP0020830

## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

See Site Plan

WELL NUMBER ▶ MW-1

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/27/90

WEATHER ▶ partly cloudy

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ TOP OF PVC = 37.26' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 5.2'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 14'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2				
					3	N/A		dark grey medium sand; with petroleum odors HNU = 130	
					4				
					5	N/A		dark grey medium sand; with petroleum odors	
					6		1	HNU = 65	
moist				1	7		1	grey clayey silt. HNU = 2	
wet					8				
					9		1	grey silty fine to medium sand into	
wet				2	10		1	tan grey mottled clayey silt; with hydrocarbon odors and sheen HNU = 28	
					1		1		
wet				3	2		2	tan grey mottled clayey silt HNU = 3	
					3		3		
					4		1/2	grey clayey silt	
wet				4	5		3	HNU = 10	
					6				
					7			Boring terminated at 14'	
					8				
					9				
					0				

See Site Plan

WELL NUMBER ▶ MW-2

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/26/90

WEATHER ▶ cloudy; 50's

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ TOP OF PVC = 37.60' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 5.4'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 14'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2	N/A		brown silty fine to coarse sand HNU = 5	
					3				
					4				
					5	N/A		brown fine to medium sand HNU = 30	
					6				
					7				
sat	loose			1	8	3		grey, slightly silty fine to medium sand; with hydrocarbon odors and sheen HNU = 110	
					9	4			
					10	5			
sat	loose			2	1	1		grey slightly silty fine to medium sand; with hydrocarbon odors HNU = 48	
					2	2			
					3	3		grey and tan slightly clayey silt HNU = 6	
wet	firm			3	4	4			
					5			Boring terminated at 14'	
					6				
					7				
					8				
					9				
					10				

See Site Plan

WELL NUMBER ▶ MW-3	LOCATION ▶ SHELL-WILLBRIDGE PLANT
DATE ▶ 10/26/90	WEATHER ▶ partly cloudy; 50's
LOGGED BY ▶ HTV	DRILLED BY ▶ GEOTECH EXPLORATIONS
DRILLING METHOD ▶ HOLLOW STEM AUGER	SAMPLING METHOD ▶ SPLIT SPOON
ELEVATION ▶ TOP OF PVC = 37.85' MSL	GRAVEL PACK ▶ 10-20 SAND
	SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC	DIAMETER 4"	LENGTH 5.5'	HOLE DIA 11"
SCREEN ▶ TYPE SCHEDULE 40 PVC	SLOT 0.020"	DIAMETER 4"	LENGTH 10.5'
			TOTAL DEPTH 14'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2				
					3	N/A		brown medium sand; slight hydrocarbon odor HNU = 10	
					4				
					5	N/A		brown silty medium sand HNU = 25	
wet	loose			1	6	4			
					7	3		tan grey slightly silty fine to medium sand HNU = 15	
					8	3			
					9	2			
wet	soft			2	10	2		grey green slightly clayey silt HNU = 19	
					1				
					2	2			
wet	firm			3	3	4		grey green slightly clayey silt HNU = 12	
					4	3			
					5				
wet	firm			4	6	1		gray green clayey silt HNU = 9	
					7	2			
					8	3			
					9				
					10				
					11				
					12				
					13				
					14			Boring terminated at 14'	

See Site Plan

WELL NUMBER ▶ MW- 4 LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/26/90 WEATHER ▶ cloudy; 55

LOGGED BY ▶ JCP DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ TOP OF PVC = 36.96' MSL GRAVEL PACK ▶ 10-20 SAND SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 5.9' HOLE DIA 13"

SCREEN ▶ TYPE SCHEDULE 40 PVC SLOT 0.020" DIAMETER 4" LENGTH 10.5' TOTAL DEPTH 14.5'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2	N/A		brown medium sand; with some silt	
					3			HNU = 35	
					4				
					5	N/A		brown grey slightly silty fine sand	
					6			HNU = 200	
					7				
sat		v. loose		1	8	3		grey fine to medium sand; with	
					9	2		hydrocarbon odor	
						3		HNU = 160	
sat		v. loose		2	10	1		gray green fine to medium sand;	
					11	3		with hydrocarbon odor	
						2		HNU = 105	
sat		v. loose		3	3	2		gray green fine sand; with trace	
					4	2		of silt and slight hydrocarbon	
						4		odor	
								HNU = 30	
sat		v. loose		4	5	1/12		gray green fine to medium sand	
					6	NR		into silty fine sand with wood debris	
						1		HNU = 18	
					7				
					8			Boring terminated at 16.5'	
					9				
					0				



See Site Plan

WELL NUMBER ▶ MW-5

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10-27-90

WEATHER ▶ foggy; 60's

LOGGED BY ▶ JCP

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

ELEVATION ▶ TOP OF PVC = 35.35' MSL

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 6.0'

HOLE DIA 13"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 16.9'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			dirt and gravel	
					1				
					2				
					3	N/A		brown silty fine sand with some clay HNU = 3	
					4				
					5	N/A		brown fine to medium sand HNU = 1	
					6				
					7				
moist	soft			1	8	2		brown sandy silty clay	
					9	2		HNU = ND	
					10	4			
moist	soft			2	1	3		brown sandy silty clay	
					2	2		HNU = 1	
					3				
sat	v. loose			3	4	1		brown clayey silty fine sand	
					5	1		HNU = 3	
					6				
sat	v. loose			4	7	1/12		same as above	
					8	NR			
					9	1			
					10				
					11				
					12				
					13				
					14				
					15				
					16				
					17				
					18			Boring terminated at 17.8'	
					19				
					20				

See Site Plan

WELL NUMBER ▶ MW-6	LOCATION ▶ SHELL-WILLBRIDGE PLANT
DATE ▶ 10-27-90	WEATHER ▶ cloudy; 50's
LOGGED BY ▶ JCP	DRILLED BY ▶ GEOTECH EXPLORATIONS
DRILLING METHOD ▶ HOLLOW STEM AUGER	SAMPLING METHOD ▶ SPLIT SPOON
ELEVATION ▶ TOP OF PVC = 35.17' MSL	GRAVEL PACK ▶ 10-20 SAND
	SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC	DIAMETER 4"	LENGTH 3.1'	HOLE DIA 13"
SCREEN ▶ TYPE SCHEDULE 40 PVC	SLOT 0.020"	DIAMETER 4"	LENGTH 10.5'
			TOTAL DEPTH 13.9'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel and dirt	
					1				
					2	N/A		brown fine to medium sand	
					3			HNU=160	
					4				
					5	N/A		brown fine to medium sand	
					6			HNU=30	
					7				
sat	v. loose			1	8	1		grey green fine to medium sand; with	
					9	2		hydrocarbon color and sheen	
					10	3		HNU=80	
sat	v. loose			2	11	1		grey green fine to medium sand; with	
					12	3		strong hydrocarbon color	
					13	4		HNU=25	
					14				
					15			Boring terminated at 14'	
					16				
					17				
					18				
					19				
					20				

## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

See Site Plan

WELL NUMBER

▶ MW-7

LOCATION

▶ SHELL-WILLBRIDGE PLANT

DATE

▶ 10/27/90

WEATHER

▶ clear; 50's

LOGGED BY

▶ JCP

DRILLED BY

▶ GEOTECH EXPLORATIONS

DRILLING METHOD

▶ HOLLOW STEM AUGER

SAMPLING METHOD

▶ SPLIT SPOON

ELEVATION

▶ Top of PVC = 35.95' ASL

GRAVEL PACK

▶ 10-20 SAND

SEAL

▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH

4.6'

HOLE DIA

13"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH

10.5'

TOTAL DEPTH

15.7'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2				
					3	N/A		brown slightly silty fine to medium sand HNU = ND	
					4				
					5	N/A		grey clayey silty fine sand HNU = ND	
					6				
					7				
moist					8	2		green grey silty fine sand; with	
	v. loose			1	9	3		"naphtha" odor	
					10	2		HNU = 35	
					11	1		green grey slightly silty fine to medium sand; with strong odor and staining	
sat					12	2		HNU = 350	
	v. loose			2	13	4			
					14	2		green grey slightly silty fine to medium sand	
sat					15	3		HNU = 230	
	loose			3	16	3			
					17	2		grey fine to medium sand	
sat					18	5		HNU = 200	
	loose			4	19	5			
					20			Boring terminated at 16.5'	
					21				
					22				
					23				
					24				
					25				
					26				
					27				
					28				
					29				
					30				

## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

See Site Plan

WELL NUMBER ▶ MW-8

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/26/90

WEATHER ▶ partly sunny; 60's

LOGGED BY ▶ JCP

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ TOP OF PVC = 35.78' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 4.9'

HOLE DIA 13"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 16'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2				
					3	N/A		brown silty fine sand HNU = ND	
					4				
					5	N/A		grey clayey silty fine sand HNU = 2	
					6				
					7				
moist	v. loose			1	8	2	2	brown silty fine sand HNU = 28	
					9	3	2		
					10	2	2		
sat	v. loose			2	1	2	2	grey slightly silty fine sand; with slight odor HNU = 35	
					2				
					3	1/12		grey green silty fine to medium sand with thin bed of clayey silty fine sand HNU = 20	
sat	v. loose			3	4	1			
					5				
sat	loose			4	6	1	5	grey slightly silty fine to medium sand; with some organics HNU = 8	
					7	7			
					8			Boring terminated at 16.5'	
					9				
					0				

## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

WELL NUMBER ▶ MW-9

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10-25-90

WEATHER ▶ cloudy; 60's

LOGGED BY ▶ JCP

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

ELEVATION ▶ TOP OF PVC = 38.36' MSL

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 7.7'

HOLE DIA 13"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 16.0'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2				
					3	N/A		brown fine to medium sand HNU = ND	
					4				
					5	N/A		brown fine to medium sand HNU = ND	
					6				
					7				
moist		v. loose		1	8	2		brown slightly silty fine to medium sand	
					9	2			
					10	3			
sat		v. loose		2	1	3		brown silty fine to medium sand HNU = 5	
					2	3			
sat		v. loose		3	3	1/12		grey slightly clayey silty fine to medium sand HNU = 1	
					4	1			
sat		v. soft		4	5	1/12		green grey slightly clayey sandy silt	
					6	2		HNU = ND	
					7				
					8			Boring terminated at 16.0'	
					9				
					0				

## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

See Site Plan

WELL NUMBER ▶ MW-10

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/25/90

WEATHER ▶ cloudy; 60's

LOGGED BY ▶ JCP

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ TOP OF PVC = 38.15' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 4.5'

HOLE DIA 13"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 12-7'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2	N/A		brown silty fine sand	
					3			HNU=ND	
					4				
					5	N/A		brown silty fine sand; with some clay	
					6			HNU=ND	
					7				
sat	v. loose			1	8	1/12	1/12	dark grey clayey silty fine to very fine sand	
					9	1/3	3	HNU=12	
					10	1/12	1/12	green grey fine to medium sand	
sat	v. loose			2	1	1/2	2	HNU=20	
					2				
					3	1/12	1/12	green grey silty fine to medium sand	
sat	v. loose			3	4	1/2	2	into slightly clayey silty fine sand at 13.5'	
					5			HNU=3	
					6			Boring terminated at 14'	
					7				
					8				
					9				
					10				

## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

See Site Plan

WELL NUMBER ▶ MW- 11

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/25/90

WEATHER ▶ cloudy; 50's

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ Top of PVC = 38.30' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 5.1'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 14'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1			- no pilot hole installed	
					2				
					3				
					4	11/12	5	tan brown clayey silt; with hydrocarbon odors	
					5	11/17	17	HNU = 40	
					6	11/1	1	tan brown clayey silt into grey green silty fine sand at 6.5'; with strong hydrocarbon odors	
					7	11/1	1	HNU = 135	
					8				
					9	11/12	1/12	green grey clayey silt; with strong hydrocarbon odors and sheen	
					10	11/1	1	HNU = 90	
					1	11/12	1/12	grey green fine sandy silt	
					2	11/2	2	HNU = 32	
					3				
					4	11/18	1/18	tan brown fine sandy silt	
					5			HNU = 15	
					6				
					7			Boring terminated at 14.0'	
					8				
					9				
					0				

## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

See Site Plan

WELL NUMBER ▶ MW-12

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/25/90

WEATHER ▶ partly cloudy; 60's

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ TOP OF PVC = 37.78' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 5.7'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 14'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2				
					3	N/A		brown grey fine to medium sand HNU = ND	
					4				
					5	N/A		brown grey fine to medium sand HNU = ND	
					6				
moist	loose			1	7	3	4	tan brown fine to medium sand HNU = 5	
					8				
wet	loose			2	9	2	2	tan brown fine to medium sand HNU = 2	
					10		4		
					1				
wet	firm			3	2	1	2	grey fine to medium sand into grey silty clay with root fragments HNU = ND	
					3		4		
					4				
moist	stiff			4	5	1	4	grey and tan mottled very fine sandy clayey silt HNU = ND	
					6		6		
					7			Boring terminated at 14'	
					8				
					9				
					10				



See Site Plan

WELL NUMBER ▶ MW-13

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/26/90

WEATHER ▶ cloudy; 50's

LOGGED BY ▶ JCP

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ TOP OF PVC = 39.72' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 6.0'

HOLE DIA 13"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 14.5'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2				
					3	N/A		brown silty clayey fine sand HNU=1	
					4				
					5	N/A		brown silty clayey fine sand HNU=3	
					6				
					7				
sat		v. loose		1	8	1/12	1	brown silty clayey fine sand HNU=1	
sat		v. loose		2	9	NR	1		
sat		v. soft		3	10	1/12	1	brown very silty fine sand HNU=ND	
					1				
					2				
					3	1/12	1	brown clayey sandy silt HNU=ND	
					4				
					5			Boring terminated at 15.0'	
					6				
					7				
					8				
					9				
					0				

See Site Plan

WELL NUMBER ▶ MW-14	LOCATION ▶ SHELL-WILLBRIDGE PLANT
DATE ▶ 10/31/90	WEATHER ▶ partly cloudy; 50's
LOGGED BY ▶ HTV	DRILLED BY ▶ GEOTECH EXPLORATIONS
DRILLING METHOD ▶ HOLLOW STEM AUGER	SAMPLING METHOD ▶ SPLIT SPOON
GRAVEL PACK ▶ 10-20 SAND	SEAL ▶ BENTONITE (HOLE PLUG)

ELEVATION ▶ TOP OF PVC = 38.11' MSL

CASING ▶ TYPE SCHEDULE 40 PVC	DIAMETER 4"	LENGTH 37'	HOLE DIA 11"
SCREEN ▶ TYPE SCHEDULE 40 PVC	SLOT 0.020"	DIAMETER 4"	LENGTH 10.5'
			TOTAL DEPTH 12.0'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2	N/A		brown fine to medium sand	
					3			HNU = 26	
SA	V. loose			1	4	NR	1	tan grey fine to medium sand	
					5		1	HNU = 52 (from pilot hole)	
					6		3		
Sat	firm			2	7	6	6	grey slightly silty fine to medium sand, with hydrocarbon odors and sheen	
					8	7	7	HNU = 18	
					9	1	1	grey green clayey silt	
Sat	soft			3	10	2	2	HNU = 10	
					1	1	1	tan fine sandy silt	
Sat	soft			4	2	1	1	HNU = 3	
					3				
					4			Boring terminated at 12.0'	
					5				
					6				
					7				
					8				
					9				
					0				

WELL NUMBER ▶ MW- 15

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/27/90

WEATHER ▶ partly cloudy; 60's

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ TOP OF PVC = 39.34' ASL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 4.1'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 15.0'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			pavement; no pilot hole advanced	
					1				
					2				
					3				
					4	4		tan brown slightly silty fine to	
					5	6		medium sand	
						4		HNU=ND	
					6	1		grey and tan mottled clayey silt	
					7	1		HNU=ND	
					8				
					9	1		grey silty clay	
					10	3		HNU=ND	
						3			
					1	25		tan brown clay with abundant gravel	
					2	21		HNU=1	
						23			
					3				
					4	7		tan grey clay with abundant gravel	
						21		HNU=ND	
					5	19			
					6			Boring terminated at 15'	
					7				
					8				
					9				
					0				

See Site Plan

WELL NUMBER ▶ MW-16

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/26/90

WEATHER ▶ partly cloudy; 50's

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

ELEVATION ▶ Top of PVC = 36.76' MSL

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 4.3'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 14'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2				
					3	N/A		grey fine to medium sand HNU = 80	
					4	3		grey slightly silty fine to medium sand; with hydrocarbon colors	
					5	3		HNU = 35	
					6	1		grey silty fine sand; with hydrocarbon colors and sheen	
					7	2		HNU = 140	
					8	1			
					9	1/12		grey silty fine to medium sand into green grey clayey silt at 9.0'; with hydrocarbon colors	
					10	1		HNU = 60	
					1				
					2				
					3				
					4	4		grey tan silty clay	
					5	4		HNU = 14	
					6	3			
					7			Boring terminated at 14'	
					8				
					9				
					10				

See Site Plan

WELL NUMBER ▶ MW- 17

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/27/90

WEATHER ▶ partly cloudy; 50's

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ Top of PVC = 37.88' ASL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 3.8'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 12.5'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2			brown silty medium to coarse sand with some gravel; with hydrocarbon odors HNU = 72	
					3	N/A			
					4		1	grey slightly silty fine to medium sand with hydrocarbon odors	
					5	///	1		
					6		1/12	grey slightly silty fine to medium sand into grey green silty clay at 6.5'	
					7	///	2	HNU = 35	
					8				
					9	///	1	grey green silty clay	
					10	///	2	HNU = 20	
					1	///	1	tan and grey mottled slightly clayey silt	
					2	///	2	HNU = 5	
					3			Boring terminated at 12.5'	
					4				
					5				
					6				
					7				
					8				
					9				
					0				

## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

See Site Plan

WELL NUMBER ▶ MW- 18

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/29/90

WEATHER ▶ cloudy; 60's

LOGGED BY ▶ JCP

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ TOP OF PVC = 35.59' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 4.3'

HOLE DIA 13"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 14.8'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2				
					3	N/A		grey fine to medium sand; with hydrocarbon odor HNU=130	
					4				
					5				
					6				
					7				
wet	v. loose			1	8	1	1	grey fine sandy silty clay; with strong hydrocarbon odor HNU=90	
					9	1	1		
sat	v. loose			2	10	2	2	grey clayey silty fine sand; with strong hydrocarbon odor and stain HNU=75	
					1	2	4		
					2				
sat	v. loose			3	3	1	1	grey slightly clayey silty fine sand; with strong hydrocarbon odor and stain HNU=40	
					4	1	2		
					5			Boring terminated at 15.0'	
					6				
					7				
					8				
					9				
					0				

See Site Plan

WELL NUMBER ▶ MW-19

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/29/90

WEATHER ▶ cloudy + rain; 50's

LOGGED BY ▶ JCP

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

ELEVATION ▶ Top of PK = 35.22' HSL

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 4.5'

HOLE DIA 13"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 15.5'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel and dirt	
					1				
					2				
					3	N/A		brown fine to medium sand HNU=100	
					4				
					5	N/A		grey silty clayey fine sand; with hydrocarbon colors	
					6			HNU=135	
					7				
moist					8	2		blue grey fine sandy silty clay; with strong hydrocarbon color	
	soft			1	4				
					9	6		HNU=130	
					10	1/12		blue grey fine sandy silty clay; with strong hydrocarbon color and staining	
sat					1	2		HNU=65	
	v. soft			2	2				
					3	1/12		grey green clayey silty fine sand; with hydrocarbon colors	
sat					4	1		HNU=35	
	v. loose			3					
					5	1/12		grey green clayey silty fine sand	
sat					6	1		HNU=22	
	v. loose			4					
					7			Boring terminated at 16.5'	
					8				
					9				
					0				

## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

See Site Plan

WELL NUMBER ▶ MW-20

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/29/90

WEATHER ▶ partly cloudy; 50's

LOGGED BY ▶ HJV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶  $\text{TOP OF PVC} = 36.59' \text{ MSL}$ 

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 9.2'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 18.5'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			thin gravel	
					1				
					2	N/A		brown fine to medium sand	
					3			HNU = ND	
					4				
					5	N/A		brown silty fine to medium sand	
					6			HNU = ND	
moist	loose			1	7	4	5	grey slightly silty fine to medium sand, with hydrocarbon odors	
					8	4	4	HNU = 160	
					9	1	4	greyish green slightly clayey silt	
moist	stiff			2	10	4	6	HNU = 4	
					1	4	4	tan to grey clayey silt	
wet	firm			3	2	4	3	HNU = 1	
					3				
					4	1	4	tan clayey silt	
moist	firm			4	5	4	3	HNU = 1	
					6				
					7	1	1	tan grey very fine sandy silt	
sat	soft			5	8	1	1	HNU = 2	
					9				
					20	1	1	tan grey silty very fine sand	
sat	1/2 loose			6		1	1	HNU = ND	
								Boring terminated at 18.5'	



## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

WELL NUMBER ▶ MW-21

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/29/90

WEATHER ▶ cloudy; 50's

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

ELEVATION ▶ Top of PVC = 36.16' MSL

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 1.2'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 12'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2				
					3	N/A		grey clayey silt	
					4	NR	12 16 16	grey clayey silt with some gravel HNU = ND	
					5				
					6		8		
					7	NR	12 14	grey clayey silt with some gravel HNU = ND	
					8				
					9		5 4	tan grey fine sandy silt HNU = ND	
					10	///	4		
					1	///	6 4	tan grey slightly clayey silt HNU = ND	
					2	///	5		
					3				
					4			Boring terminated at 12'	
					5				
					6				
					7				
					8				
					9				
					0				

See Site Plan

## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

WELL NUMBER ▶ MW-22

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/30/90

WEATHER ▶ rain ; 50's

LOGGED BY ▶ JCP

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ Top of PVC = 37.48' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 5.6'

HOLE DIA 13"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 16.0'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			pavement	
					1				
					2				
					3				
moist	loose			1	4	4		brown fine to medium sand	
					5	5		HNU = 0ND	
					5	5			
wet	v. loose			2	6	2		grey brown silty clayey fine sand	
					6	1		HNU = 70	
					7	1			
					8	2		gray green sandy clayey silt; with	
sat	soft			3	9	3		hydrocarbon odor	
					9	3		HNU = 85	
					10				
					1	2		grey green sandy clayey silt; with	
sat	soft			4	2	2		hydrocarbon odor	
					4	4		HNU = 20	
					3				
					3	2		brown grey fine sandy clayey silt	
sat	soft			5	4	2		HNU = 11	
					4	2			
					5				
					5	1		grey green clayey silty fine sand	
sat	v. loose			6	6	2		HNU = 105	
					6	1			
					7			Boring terminated at 16.5'	
					8				
					9				
					0				

See Site Plan

WELL NUMBER ▶ MW-23

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/30/90

WEATHER ▶ rain; 50's

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ Top of PK = 37.89' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 3.9'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 12'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2	N/A		grey fine to medium sand; with strong hydrocarbon odors and staining HNU = 175	
					3				
					4				
					5				
					6				
moist		stiff		1	7	3		tan grey clayey silt; with hydrocarbon odors and sheen HNU = 65	
					8	4			
					9	7			
					10	2		grey green silty clay HNU = 38	
sat		firm		2	11	3			
					12	3			
					13	1		grey green silty clay HNU = 44	
sat		v. soft		3	14	1			
					15	1			
					16			Boring terminated at 13.0'	
					17				
					18				
					19				
					20				

See Site Plan

WELL NUMBER ▶ MW-24

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/30/90

WEATHER ▶ rain; 50's

LOGGED BY ▶ HJV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

ELEVATION ▶ Top of PVC = 36.98' MSL

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 3.3'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 12.0'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2				
					3	N/A		grey fine to medium sand; with hydrocarbon colors and stain. Product flows into hole	
					4			HNU=155	
					5				
					6				
wet		stiff		1	7	4		grey slightly silty fine to medium sand	
					8	6		into grey green clayey silt at 7.0'	
					9	7		HNU=46	
					10	2		grey green clayey silt into grey green	
sat		soft		2	11	1		fine sandy silt at 9.5'	
					12	2		HNU=110	
					13				
sat		v. soft		3	14	1		grey green fine sandy clayey silt	
					15	1/12		HNU=16	
					16			Boring terminated at 12.0'	
					17				
					18				
					19				
					20				

See Site Plan

WELL NUMBER ▶ MW-25

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/30/90

WEATHER ▶ rain; 50's

LOGGED BY ▶ JCP

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

ELEVATION ▶ Top of PVC = 36.56' MSL

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 5.5'

HOLE DIA 13"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 14.1'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2	N/A		brown silty fine sand HNU = ND	
					3				
					4				
					5	N/A		brown silty fine sand HNU = ND	
					6				
					7				
sat		v. soft		1	8	1/2		grey green clayey fine sandy silt HNU = 5	
					9	2			
sat		firm		2	10	3		grey green clayey fine sandy silt HNU = 3	
					1	5			
					2	6			
sat		v. loose		3	3	2		brown grey clayey silty fine sand HNU = ND	
					4	2			
					4	3			
					5			Boring terminated at 14.3'	
					6				
					7				
					8				
					9				
					0				

See Site Plan

WELL NUMBER ▶ MW-26

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/31/90

WEATHER ▶ cloudy; 50's

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ Top of PK = 36.61' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 5.5'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 14.0'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2	N/A		brown silty fine sand	
					3			HNU = 50	
					4				
					5	N/A		grey silty clayey fine sand	
					6			HNU = 32	
wet	soft			1	7	2	1	grey green very fine sandy silt; with hydrocarbon odors	
					8	2		HNU = 14	
					9	1/12		grey clayey silt; with small wood fragments	
wet	soft			2	10	2		HNU = 55	
					1				
sat	firm			3	2	3	5	grey clayey silt; with hydrocarbon odors	
					3			HNU = 125	
					4	3	1	grey to tan fine sandy silt	
sat	firm			4	5	5		HNU = 45	
					6			Boring terminated at 14.0'	
					7				
					8				
					9				
					0				

See Site Plan

WELL NUMBER ▶ MW- 27

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/30/90

WEATHER ▶ rain; 50's

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

ELEVATION ▶ Top of PVC = 37.50' MSL

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 3.8'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 12.0'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2				
					3	N/A		grey fine to medium sand HNU = 700	
					4				
					5				
					6				
wet		V. soft		1	7	2	1/12	grey silty clay; with hydrocarbon odors HNU = 2	
moist		V. stiff		2	9	3	9/12	grey green clayey silt; with hydrocarbon odors HNU = 1	
					10				
wet		soft		3	11	1	1/2	greenish grey clayey silt HNU = 1	
					12			Boring terminated at 13.0'	
					13				
					14				
					15				
					16				
					17				
					18				
					19				
					20				

WELL NUMBER ▶ MW-28

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/31/90

WEATHER ▶ partly sunny; 60's

LOGGED BY ▶ JCP

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

ELEVATION ▶ Top of PVC = 36.22' MSL

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 4.0'

HOLE DIA 13"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 14.8'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2	N/A		brown silty fine to medium sand	
					3			HNU = 500	
					4				
					5	N/A		brown grey fine to medium sand	
					6			HNU = 800	
					7				
Wet		V. loose		1	8		1/12	grey silty clayey fine sand; with free product in sample	
					9		1	HNU = 125	
Sat		V. loose		2	10		WH	grey silty clayey fine sand; with oil staining	
					1		1	HNU = 170	
					2				
Sat		V. soft		3	3		WH	grey fine sandy clayey silt	
					4			HNU = 32	
					5				
Sat		V. soft		4	6		1	grey fine sandy clayey silt; with some organics	
					6		2	HNU = 45	
					7			Boring terminated at 16.5'	
					8				
					9				
					0				



## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

See Site Plan

WELL NUMBER ▶ MW-29

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/30/90

WEATHER ▶ rain; 50's

LOGGED BY ▶ JCP

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ Top of PVC = 37.60' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 8.6

HOLE DIA 13"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 17.7'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2	N/A		brown silty fine sand	
					3			HNU=170	
					4				
					5	N/A		grey silty clayey fine sand	
					6			HNU=200	
					7				
moist	loose			1	8	2		grey fine to medium sand; with	
					9	4		hydrocarbon odor	
					10	5		HNU=85	
sat	loose			2	1	NR		grey fine to medium sand	
					2	4		HNU=40	
					3	6			
sat	v. loose			3	3	2		grey fine to medium sand with	
					4	1		thin bed of clayey silty fine sand	
					5	1		at 13.5'	
					6			HNU=12	
sat	soft			4	5	2		brown grey sandy clayey silt; with	
					6	2		some organics	
					7	3		HNU=1	
					8			Boring terminated at 17.8'	
					9				
					0				

## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

See Site Plan

WELL NUMBER ▶ MW-30

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/30/90

WEATHER ▶ rain; 50's

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ Top of PVC = 38.22' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 3.4'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 12.0'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2	N/A		brown fine to medium sand	
					3			HNU = 035	
					4			* apparent sludge layer at 1 to 3' (tank bottom)	
					5	N/A		brown fine to medium sand	
					6			HNU = 060	
					7	1/12	1	grey slightly silty fine to medium sand; with hydrocarbon odors and staining	
Wet	V. loose			1	8				
					9	1/12	1	grey clayey silt	
Wet	V. soft			2	10			HNU = ND	
					1	4	6	greenish tan clayey silt	
moist	stiff			3	2	7		HNU = 2	
					3				
					4			Boring terminated at 12.0'	
					5				
					6				
					7				
					8				
					9				
					0				

## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

See Site Plan

WELL NUMBER ▶ MW- 31

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/31/90

WEATHER ▶ partly sunny; 60's

LOGGED BY ▶ JCP

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ Top of PVC = 39.38' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 5.6'

HOLE DIA 13"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 13.2'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2				
					3	N/A		silty fine to medium sand; with hydrocarbon staining HNU = 150	
					4				
					5	N/A		brown silty fine to medium sand HNU = 45	
					6				
					7				
sat	v. loose			1	8	1/18		gray silty fine to medium sand HNU = 5	
					9				
sat	v. loose			2	10	1/12		gray slightly clayey silty fine sand; with hydrocarbon odors HNU = 6	
					1	2			
					2				
sat	v. loose			3	3	1		gray silty fine sand; with hydrocarbon odors HNU = 10	
					4	2			
					5	2			
					6			Boring terminated at 14.0'	
					7				
					8				
					9				
					0				

See Site Plan

WELL NUMBER ▶ MW-32

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/31/90

WEATHER ▶ partly cloudy; 50's

LOGGED BY ▶ HJV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ Top of PVC = 38.84' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 3.5'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 12'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			gravel	
					1				
					2	N/A		gray brown fine to medium sand	
					3			HNU = 8	
					4		3	grey brown slightly silty fine to	
ist	loose			1	5	2	2	medium sand	
						3		HNU = 20	
					6	1/10		grey brown slightly silty fine to medium	
sat	v. soft			2	7			sand, into green grey clayey silt	
								with root fragments at 7.0'	
					8			HNU = 19	
					9		1	grey clayey silt; with hydrocarbon	
sat	soft			3	10		1	odors	
								HNU = 85	
					1		2	blue green clayey silt	
					2	4	4		
damp	firm			4		4		HNU = 20	
					3				
					4			Boring terminated at 12.0'	
					5				
					6				
					7				
					8				
					9				
					10				

See Site Plan

WELL NUMBER ▶ MW- 33

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 11/1/90

WEATHER ▶ Fog; 40's

LOGGED BY ▶ HJV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ Top of PVC = 41.17' MSL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 16.1'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 23.0'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			dirt	
					1				
					2	N/A		brown slightly silty fine to medium sand	
					3			HNU = ND	
					4				
					5	N/A		brown fine to medium sand	
					6			HNU = 20	
damp	fine			1	7	4		tan brown slightly silty fine to medium sand	
					8	6			
					9	10		HNU = ND	
					10				
damp	dense			2	11	8		tan brown slightly silty fine to medium sand	
					12	16			
					13	16		HNU = 44	
					14				
damp	dense			3	15	9		tan brown slightly silty fine to medium sand	
					16	14			
					17	14		HNU = 25	
					18				
damp	dense			4	19	12		tan brown slightly silty fine to medium sand	
					20	21			
					21	18		HNU = 22	
					22				
					23	7		grey silty fine to medium sand	
					24	10			
					25	8		HNU = 4	
					26				
					27	4		tan silty fine to medium sand	
					28	6			
					29	7		HNU = 10	
					30				

## SHELL OIL COMPANY — WELL LOG

PAGE 2 OF 2

See Site Plan

WELL NUMBER ▶ MW- 33

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 11/1/90

WEATHER ▶ Fog; 40's

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

ELEVATION ▶ Top of PVC = 41.17' HSL

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 16.1'

HOLE DIA 11"

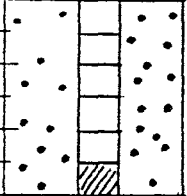
SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 23.0'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					20				
					1	///	2	tan and grey slightly silty fine to medium sand HNU = 1	
					2	///	4		
					2	///	6		
					3			boring terminated at 23.0'	
					4				
					5				
					6				
					7				
					8				
					9				
					0				
					1				
					2				
					3				
					4				
					5				
					6				
					7				
					8				
					9				
					0				

WELL NUMBER ▶ MW-34

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 11/1/90

WEATHER ▶ Sunny ; 50's

LOGGED BY ▶ HIV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ Top of PVC = 41.50' ASL

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 15.3'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 23.0

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			dirt	
					1				
					2				
					3	N/A		brown fine to medium sand HNU = ND	
damp	v. loose			1	4	2	1	tan brown slightly silty fine to medium sand	
					5	2	2	HNU = ND	
					6	5			
damp	v. firm			2	7	12	13	tan brown slightly silty fine to medium sand	
					8			HNU = 4	
					9	9			
damp	v. firm			3	10	12	14	tan brown slightly silty fine to medium sand	
								HNU = ND	
					1	9			
damp	v. firm			4	2	14	15	tan brown slightly silty fine to medium sand	
					3			HNU = 1	
					4	9			
moist	v. firm			5	5	12	15	tan brown slightly silty fine to medium sand	
					6			HNU = 11	
					7	4			
wet	firm			6	8	8	8	tan brown slightly silty fine to medium sand	
					8			HNU = 11	
					9	WH		blue green clayey silt	
wet	v. soft			7	20			HNU = ND	

## SHELL OIL COMPANY — WELL LOG

PAGE 2 OF 2

WELL NUMBER ▶ MW-34

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 11/1/90

WEATHER ▶ Sunny; 50's

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

ELEVATION ▶ Top of PVC = 41.50' HSL

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 15.3'

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

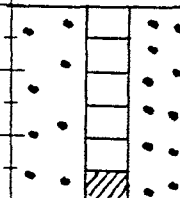
SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 23.0'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					20				
					1	WH		gray silty clay	
					2	4		HNU = ND	
					3			Boring terminated at 23.0'	
					4				
					5				
					6				
					7				
					8				
					9				
					0				
					1				
					2				
					3				
					4				
					5				
					6				
					7				
					8				
					9				
					0				





## SHELL OIL COMPANY — WELL LOG

PAGE 1 OF 1

See Site Plan

WELL NUMBER ▶ MW-35

LOCATION ▶ SHELL-WILLBRIDGE PLANT

DATE ▶ 10/29/90

WEATHER ▶ cloudy; 50's

LOGGED BY ▶ HTV

DRILLED BY ▶ GEOTECH EXPLORATIONS

DRILLING METHOD ▶ HOLLOW STEM AUGER

SAMPLING METHOD ▶ SPLIT SPOON

ELEVATION ▶ Top of PVC = 35.22' ML

GRAVEL PACK ▶ 10-20 SAND

SEAL ▶ BENTONITE (HOLE PLUG)

CASING ▶ TYPE SCHEDULE 40 PVC

DIAMETER 4"

LENGTH 2.2

HOLE DIA 11"

SCREEN ▶ TYPE SCHEDULE 40 PVC

SLOT 0.020"

DIAMETER 4"

LENGTH 10.5'

TOTAL DEPTH 13.0'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0			pavement	
					1				
					2				
					3				
dump	v. loose			1	4	3		grey slightly silty fine to medium sand; with hydrocarbon odor	
					5	2		HNU=190	
					6				
moist	v. loose			2	7	1		grey slightly silty fine to medium sand; with hydrocarbon odor	
					8	1		HNU=165	
					9				
sat	loose			3	10	5		grey slightly silty fine to medium sand	
						4		HNU=12	
					1				
					2	2		grey slightly silty fine to medium sand; with wood fragments	
wet	loose			4	3	4		HNU=40	
					4				
sat	v. stiff			5	5	2		grey slightly clayey silt; with wood fragments	
						8		HNU=25	
					6			Boring terminated at 13.5'	
					7				
					8				
					9				
					0				

LOCATION MAP						SHELL OIL COMPANY — WELL LOG				PAGE <u>1</u> OF <u>2</u>		
See Site Plan						WELL NUMBER ▶ MW-36		LOCATION ▶ Shell Willbridge Plant				
						DATE ▶ 5/2/91		WEATHER ▶ SUNNY; Low 70's				
						LOGGED BY ▶ Ray Gruttmacher		DRILLED BY ▶ Geo Tech Explorations				
						DRILLING METHOD ▶ Hollow Stem Auger		SAMPLING METHOD ▶ Split Spoon				
						GRAVEL PACK ▶ 8 x 12 sand		SEAL ▶ Bentonite Hole Plug				
ELEVATION ▶ 36.71												
CASING ▶ TYPE Schedule 40 PVC						DIAMETER 4"		LENGTH 8.6'		HOLE DIA 11"		
SCREEN ▶ TYPE Schedule 40 PVC						SLOT 0.020"		DIAMETER 4"		LENGTH 20.0'		
TOTAL DEPTH 30.0'												
MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS				WELL COMPLETION
damp				MW-36 @ 5'	0			Gravel				
					1			Dark Brown medium sand				
					2			Tip = 0				
					3							
					4							
					5	///		Dark Brown medium clayey sand				
					6			Tip = 0				
					7							
					8							
					9							
v. moist				MW-36 @ 10'	10	///		Dark Brown medium silty sand				
					1							
					2							
					3							
					4							
					5							
					6							
					7							
					8							
					9							
sat.					15			Greyish Black medium silty sand				
					6			minor H.C. odor.				
					7							
					8							
					9							
					10							
					11							
					12							
					13							
					14							

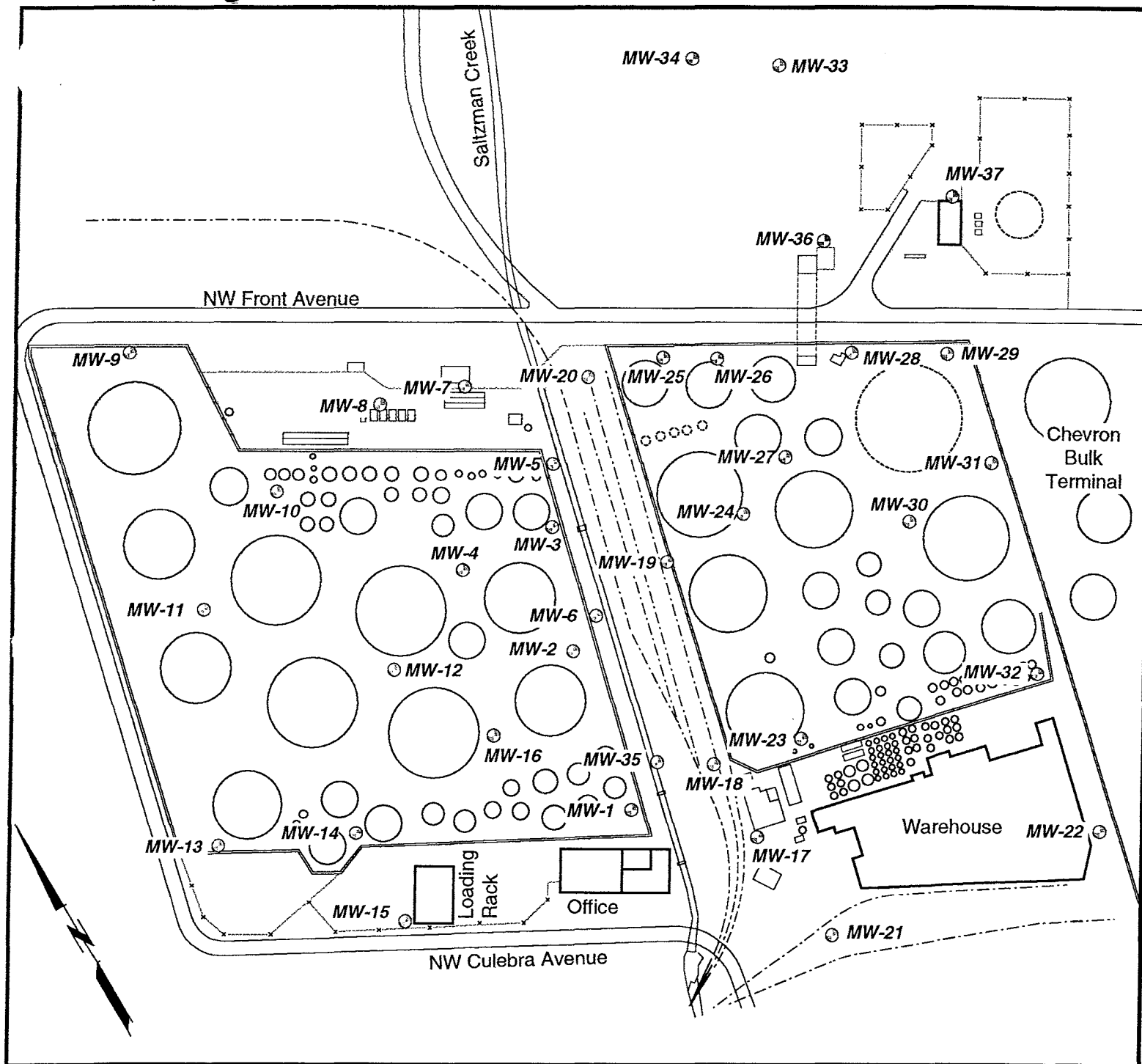
LOCATION MAP						SHELL OIL COMPANY — WELL LOG				PAGE <u>2</u> OF <u>2</u>		
See Site Plan						WELL NUMBER ▶ <u>MW-36 (cont)</u>		LOCATION ▶ <u>Shell Willbridge Plant</u>				
						DATE ▶ <u>5/2/91</u>		WEATHER ▶ <u>SUNNY; Low 70's</u>				
						LOGGED BY ▶ <u>Roy Grutzmacher</u>		DRILLED BY ▶ <u>Geo tech Explorations</u>				
						DRILLING METHOD ▶ <u>Hollow Stem Auger</u>		SAMPLING METHOD ▶ <u>Split Spoon</u>				
						GRAVEL PACK ▶ <u>8 x 12 sand</u>		SEAL ▶ <u>Bentonite Hole Plug</u>				
ELEVATION ▶												
CASING ▶ TYPE <u>Schedule 40 PVC</u>						DIAMETER <u>4"</u>		LENGTH		HOLE DIA <u>11"</u>		
SCREEN ▶ TYPE <u>Schedule 40 PVC</u>						SLOT <u>0.020"</u>		DIAMETER <u>4"</u>		TOTAL DEPTH <u>30.0'</u>		
MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS				WELL COMPLETION
sat.					20			tanish grey fine to medium sand				
					1							
					2							
					3							
					4							
					25							
					6							
					7							
					8							
					9							
sat.					30			Boring terminated at 30.0'				
					1							
					2							
					3							
					4							
					5							
					6							
					7							
					8							
					9							
					0							

LOCATION MAP					SHELL OIL COMPANY — WELL LOG				PAGE <u>1</u> OF <u>2</u>	
See Site Plan					WELL NUMBER ▶ MW-37		LOCATION ▶ Shell Willbridge Plant			
					DATE ▶ 5/2/91		WEATHER ▶ SUNNY; Low 70's			
					LOGGED BY ▶ Ray Bratzmacher		DRILLED BY ▶ Geo Tech Explorations			
					DRILLING METHOD ▶ Hollow Stem Auger		SAMPLING METHOD ▶ Split Spoon			
					GRAVEL PACK ▶ 8 x 12 sand		SEAL ▶ Bentonite Hole Plug			
ELEVATION ▶ 36.69										
CASING ▶ TYPE Schedule 40 PVC					DIAMETER 4"		LENGTH 9.6'		HOLE DIA 11"	
SCREEN ▶ TYPE Schedule 40 PVC					SLOT 0.020"		DIAMETER 4"		LENGTH 20.0'	
TOTAL DEPTH 30.0'										
MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS		WELL COMPLETION
Moist					0			Asphalt		
					1			Fill - Dark brown, Gravelly silty sand		
					2			Dark Brown medium grained silty sand, NO odors.		
					3					
					4					
Moist					5			TIP = 0		
					6					
					7					
					8					
					9			Dark Brown fine to medium silty sand, slight HC odor.		
Moist					10			TIP = 25		
					1					
					2					
					3					
					4					
Sat.					15			Dark grey silty sand, slight oily sheen, mild HC odor.		
					6					
					7					
					8					
					9					
					20					

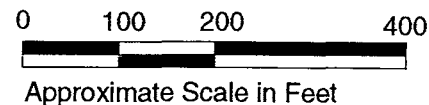
# Site Plan

## Shell Willbridge Terminal

### Portland, Oregon



Base map prepared from Site Potentiometric Surface Map created by Law/Crandall, Inc., dated 8/14/91.



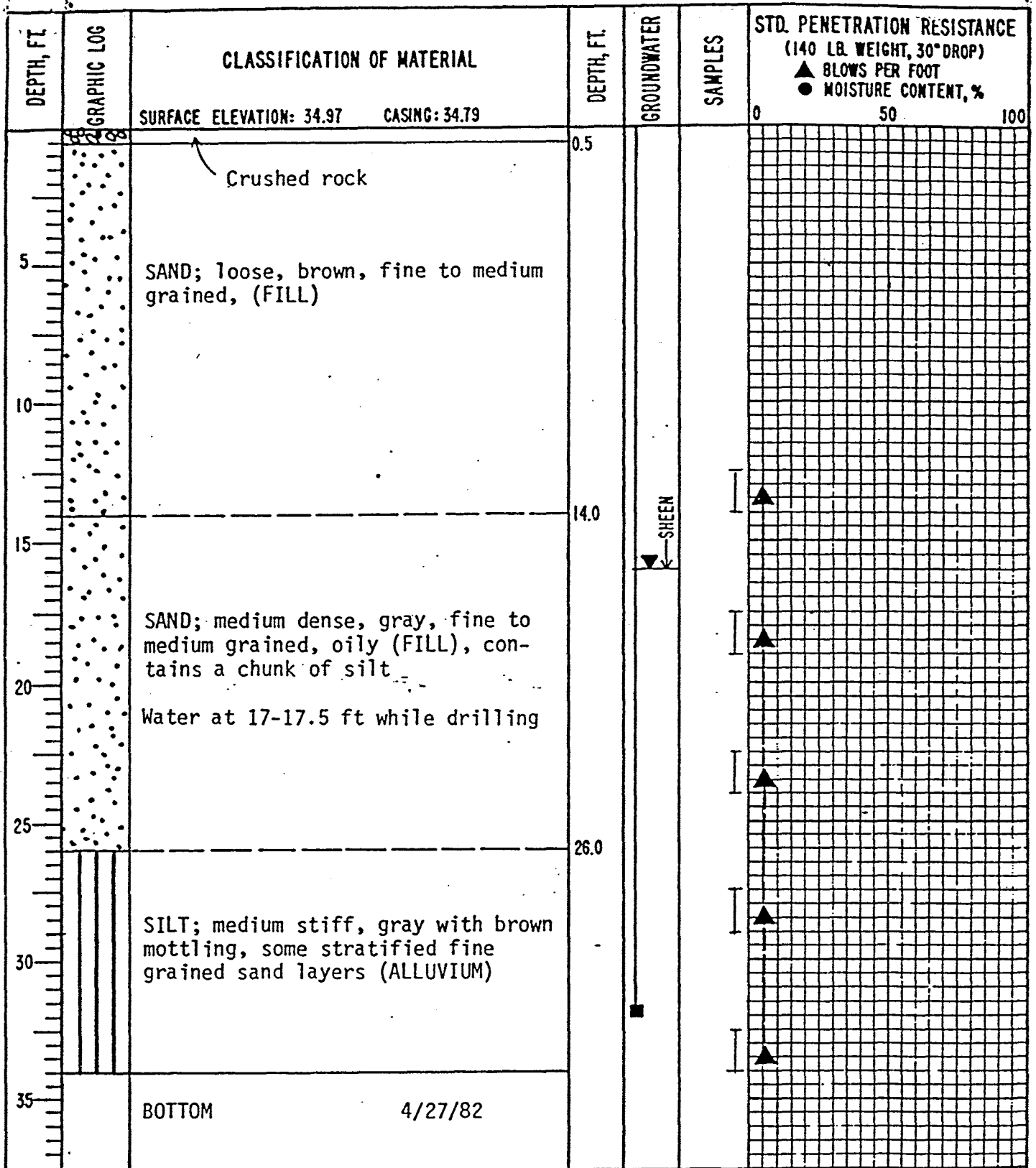
#### Legend:

- MW-4 ○ Monitoring Well Location and Designation
- Railroad Spur Location



**HARTCROWSER**  
J-5064-01 8/94  
Figure 1

COP0020871



#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN

\* SAMPLE NOT RECOVERED

ATTERBERG LIMITS

—●— LIQUID LIMIT  
—●— NATURAL WATER CONTENT

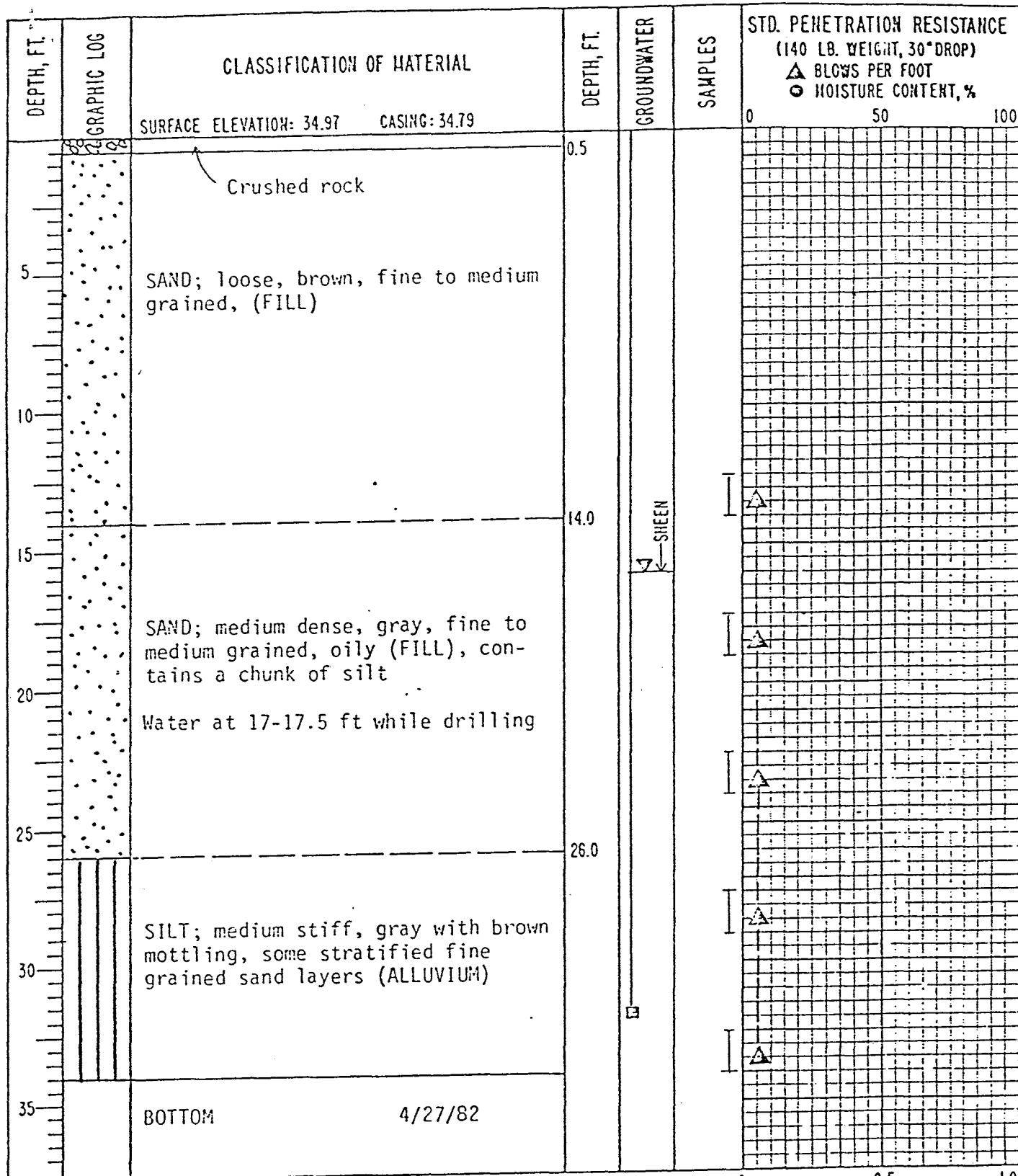
▼ WATER LEVEL  
■ POROUS TIP



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PORTLAND, OREGON

BORING LOG B-1

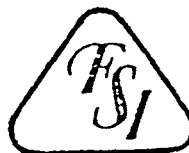
COP0020872



#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
- LIQUID LIMIT
- NATURAL WATER CONTENT

- ▽ WATER LEVEL
- POROUS TIP



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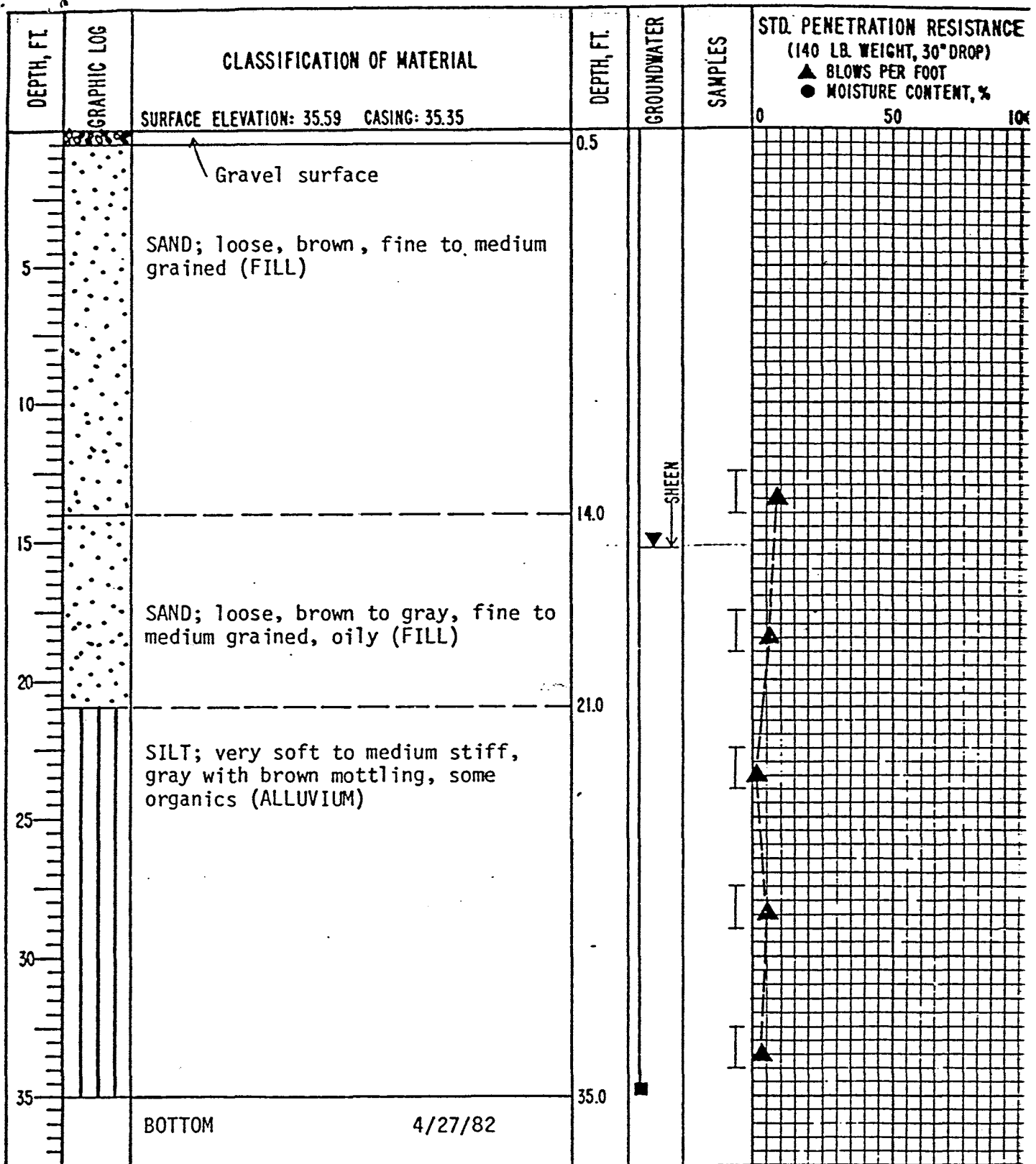
BORING LOG B-1

DATE MAY 1982

JOB NO. 210-1

FIG. 4

COP0020873



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN

\* SAMPLE NOT RECOVERED

ATTERBERG LIMITS

—●— LIQUID LIMIT

- ▼ WATER LEVEL
- POROUS TIP

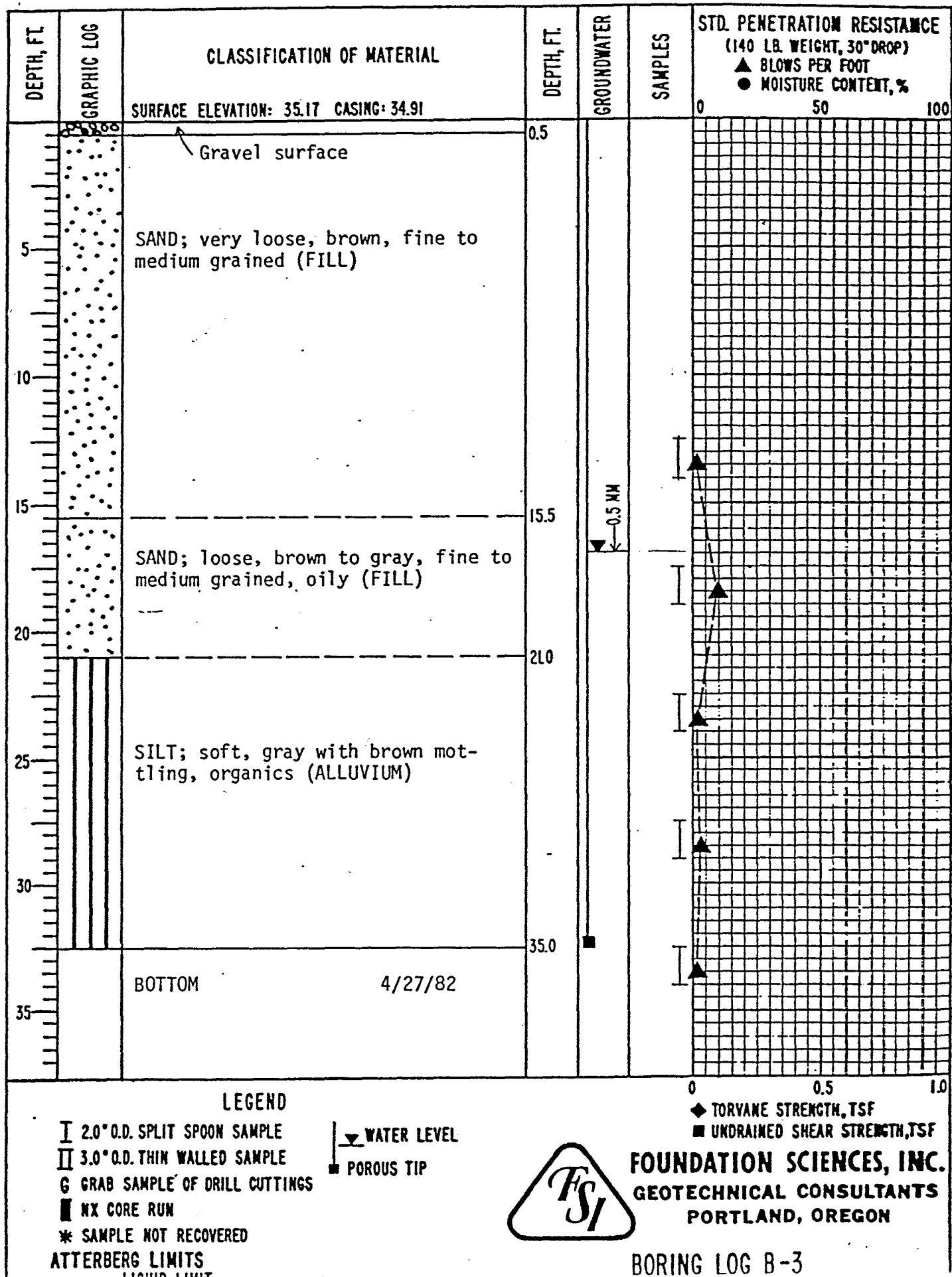


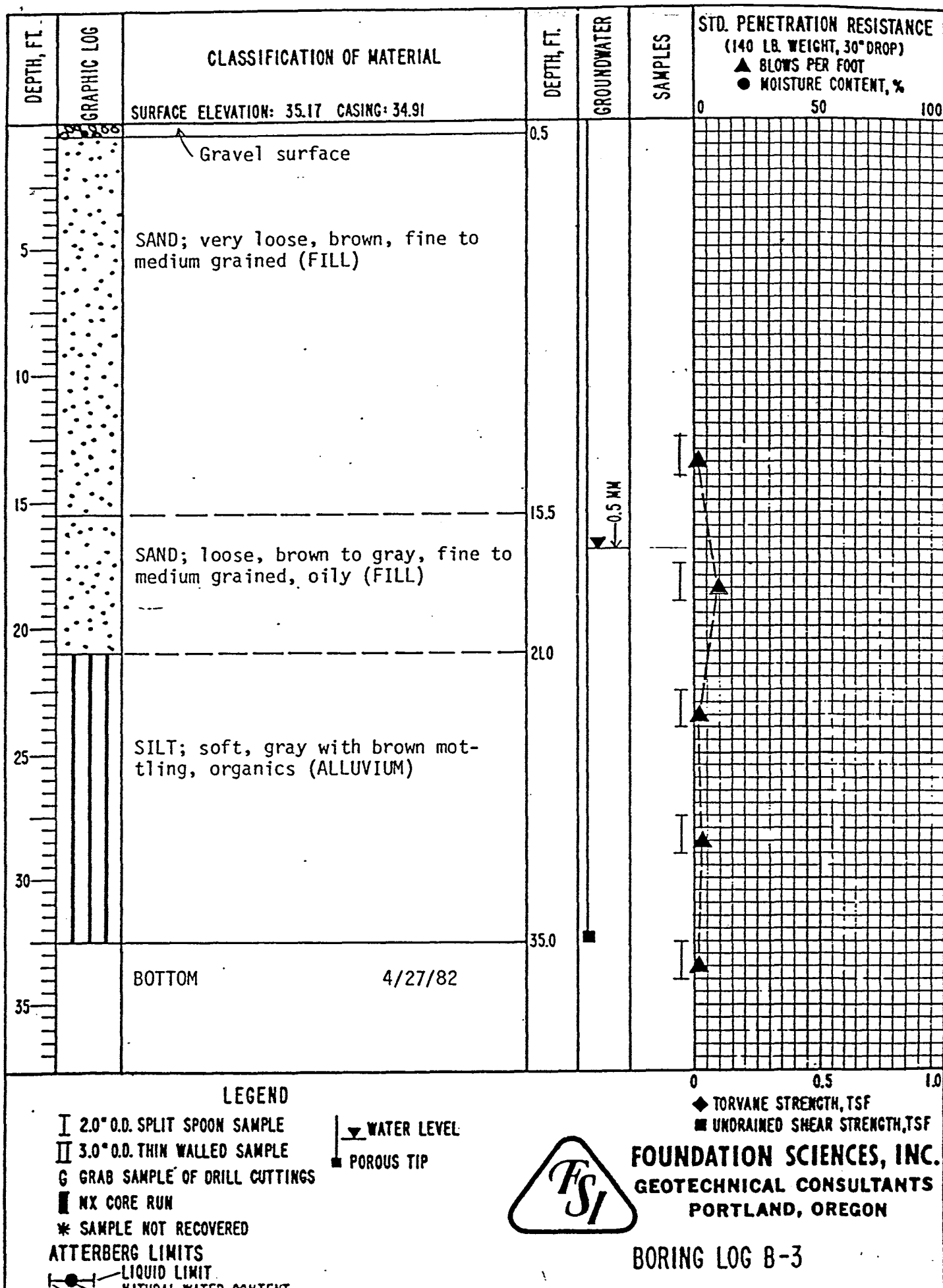
**FOUNDATION SCIENCES, INC**  
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**PORTLAND, OREGON**

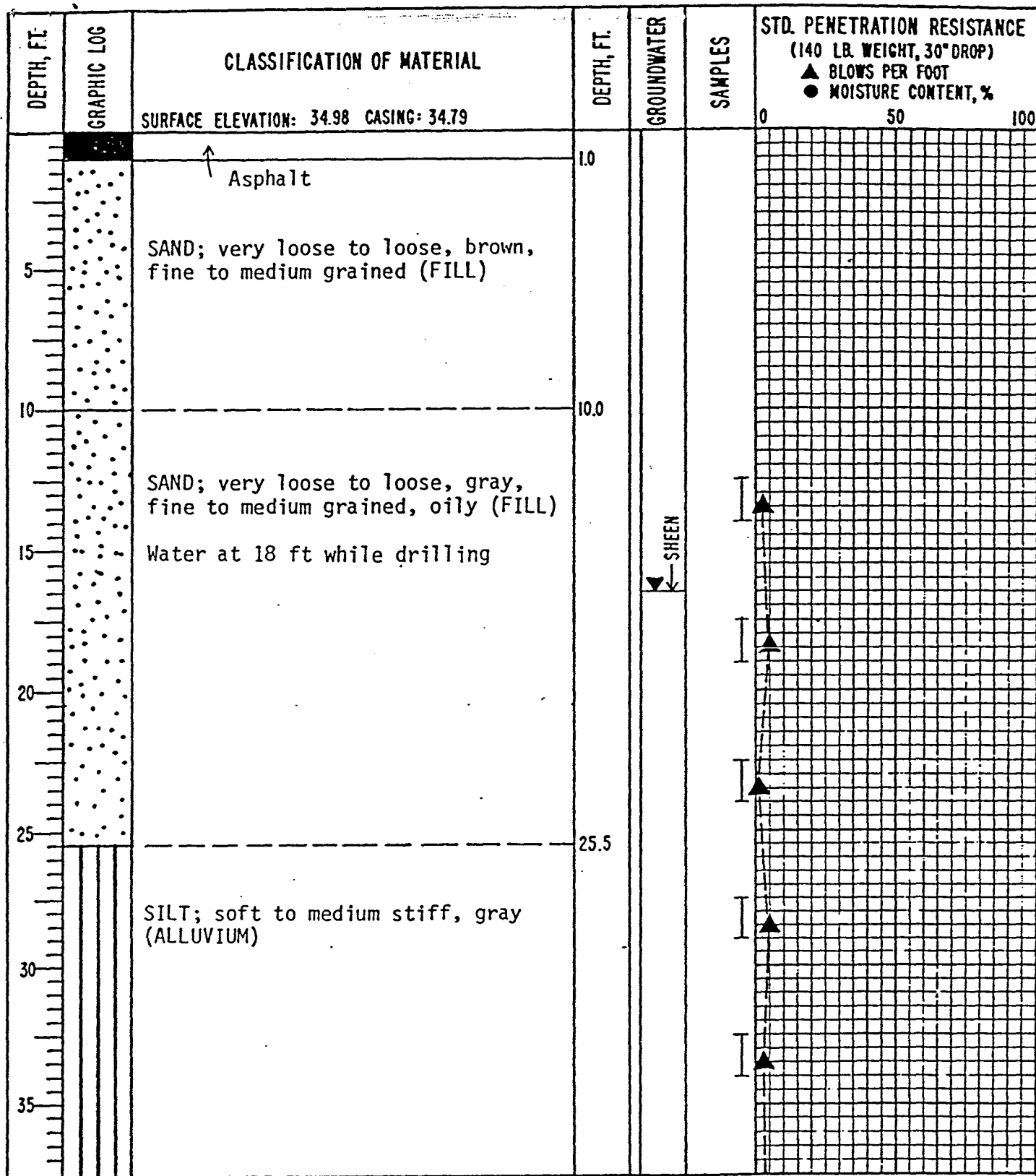
BORING LOG B-2

- ◆ TORVANE STRENGTH, TSF
- UNDRAINED SHEAR STRENGTH, TSF









### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

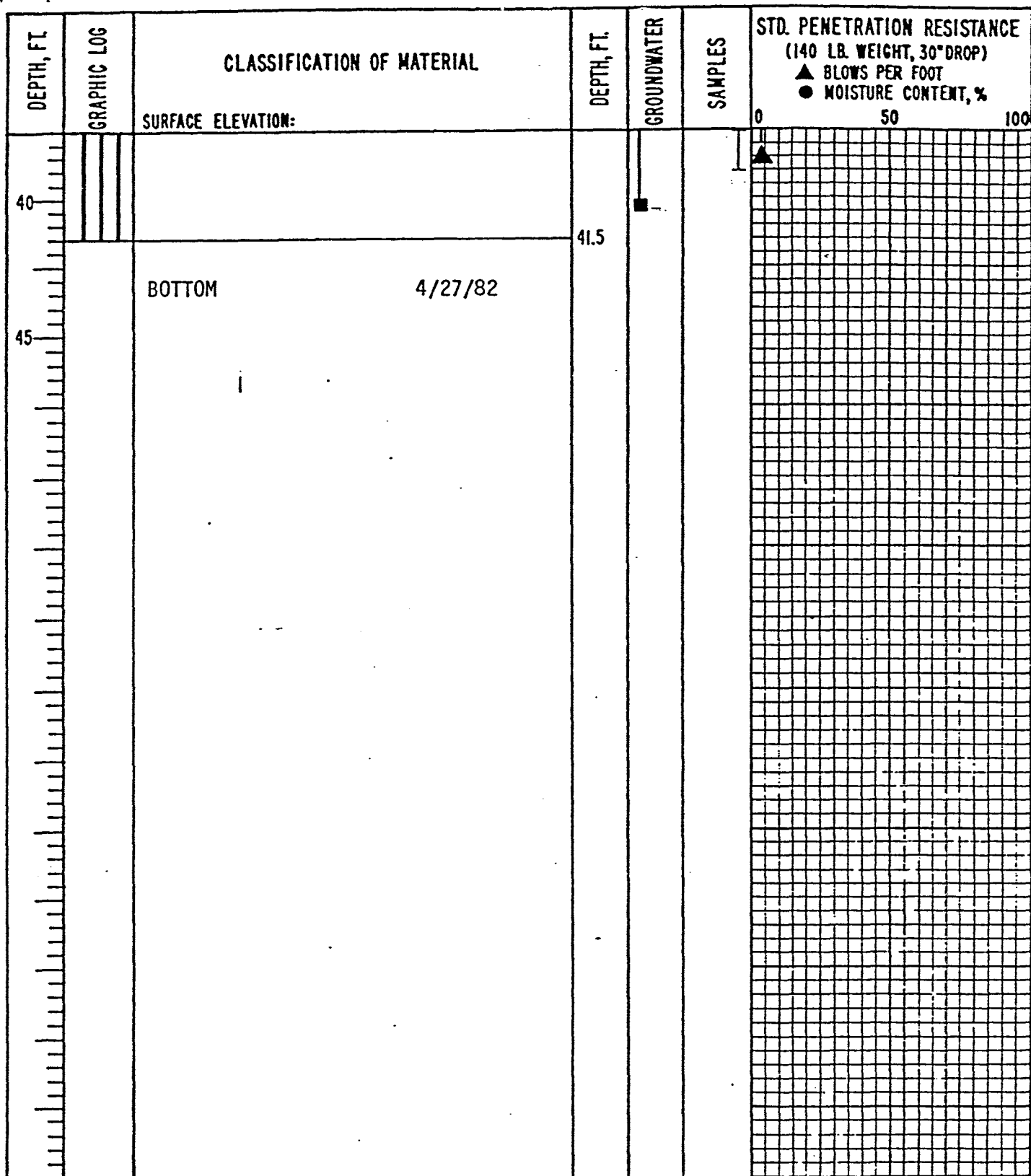
- LIQUID LIMIT
- NATURAL WATER CONTENT

- ▼ WATER LEVEL
- POROUS TIP



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BORING LOG B-4



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN

\* SAMPLE NOT RECOVERED

ATTERBERG LIMITS  
LIQUID LIMIT

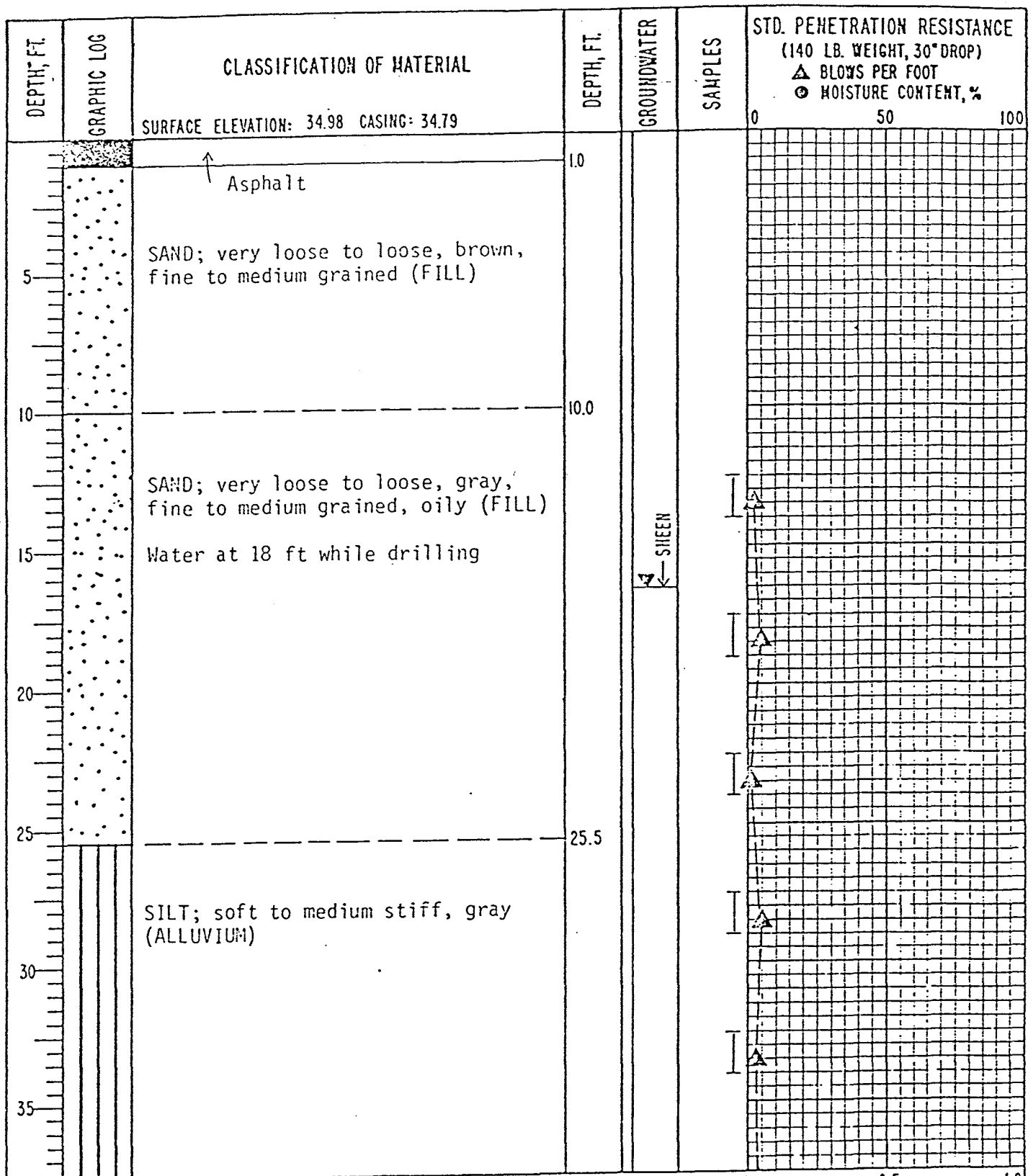
- ▼ WATER LEVEL
- POROUS TIP



◆ TORVANE STRENGTH, TSF  
■ UNDRAINED SHEAR STRENGTH, TSF  
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BORING LOG B-4 (CONT.)

COP0020878



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT
- ▽ WATER LEVEL
- ▼ POROUS TIP



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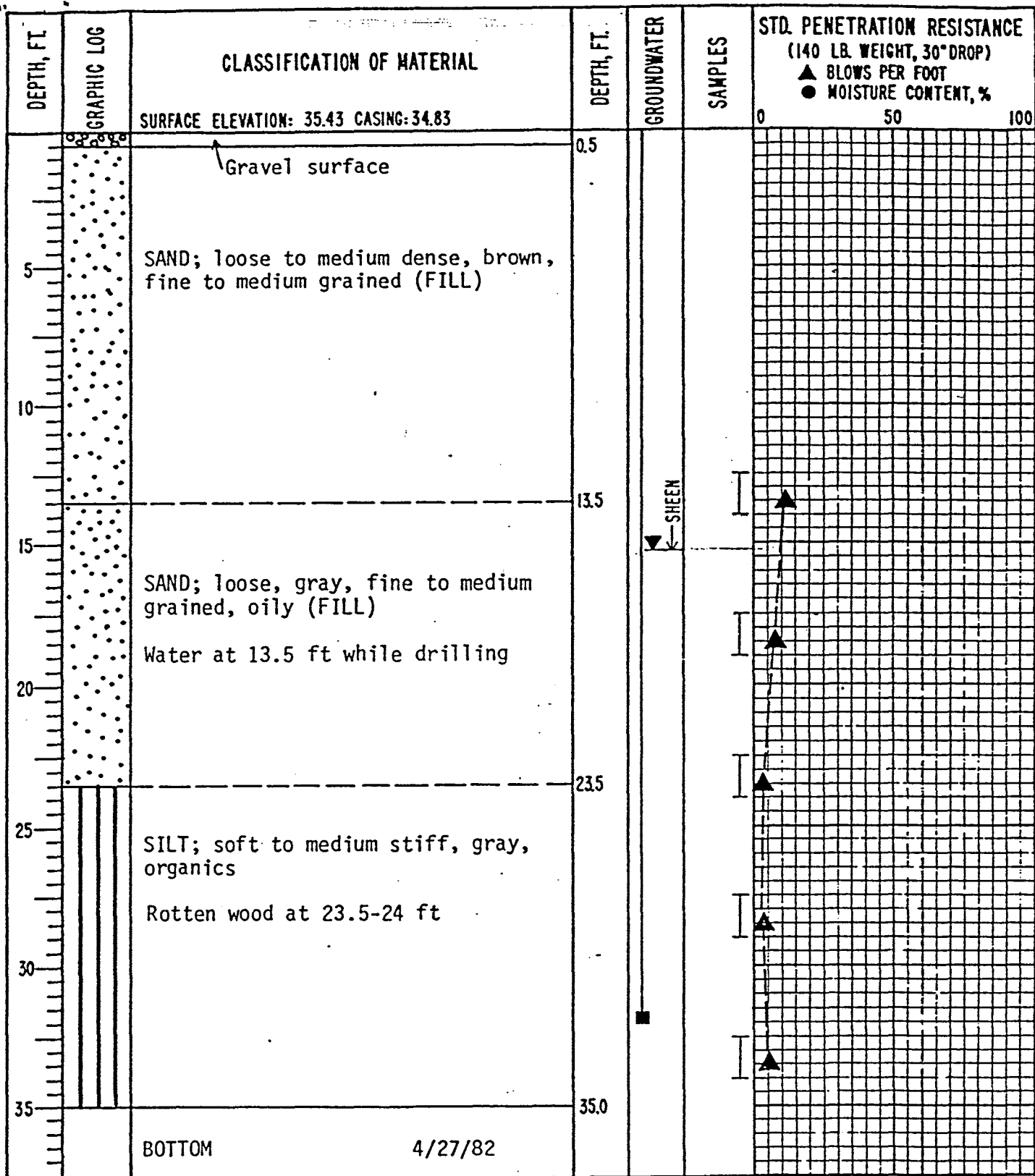
**BORING LOG B-4**

DATE MAY 1982

JOB NO. 210-1

FIG. 7

COP0020879



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

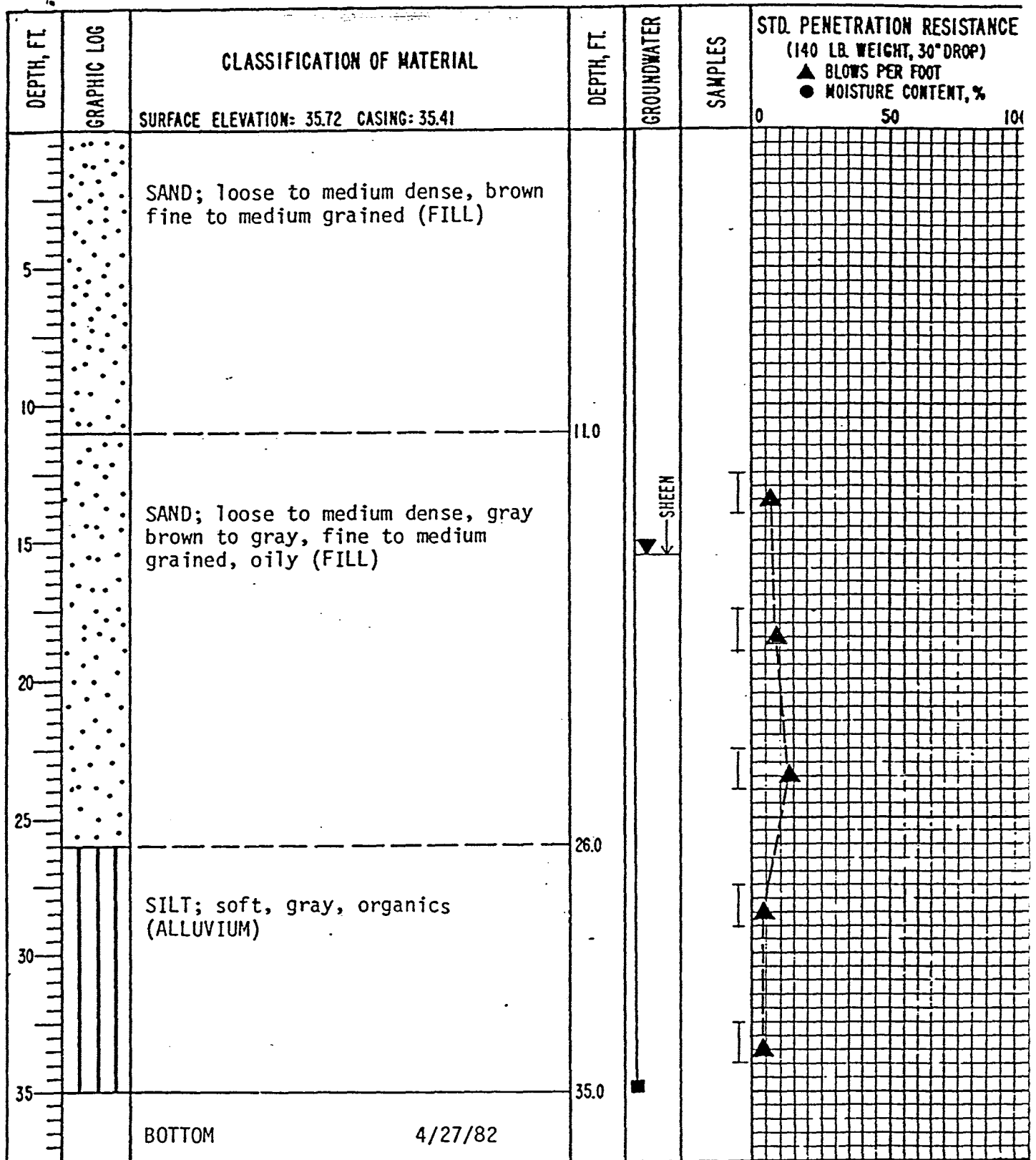
ATTERBERG LIMITS  
 ● LIQUID LIMIT  
 ○ PLASTIC WATER CONTENT

- ▼ WATER LEVEL
- POROUS TIP



◆ TORVANE STRENGTH, TSF  
 ■ UNDRAINED SHEAR STRENGTH, TSF  
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 PORTLAND, OREGON

BORING LOG B-5



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

ATTERBERG LIMITS

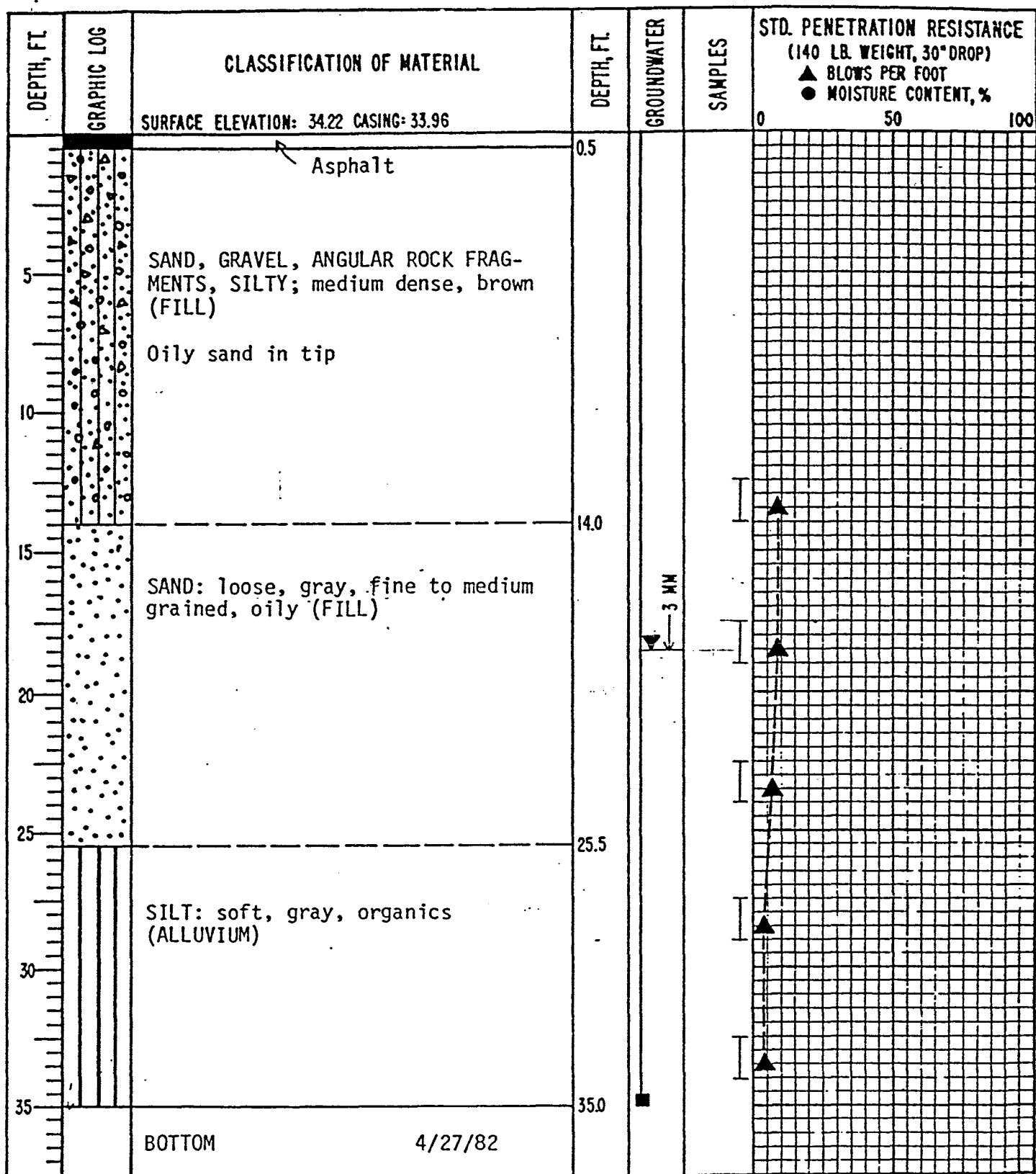
● LIQUID LIMIT

- ▼ WATER LEVEL
- POROUS TIP



◆ TORVANE STRENGTH, TSF  
■ UNDRAINED SHEAR STRENGTH, TSF  
**FOUNDATION SCIENCES, INC.**  
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PORTLAND, OREGON

BORING LOG B-6



#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
- · · LIQUID LIMIT

- ▼ WATER LEVEL
- POROUS TIP

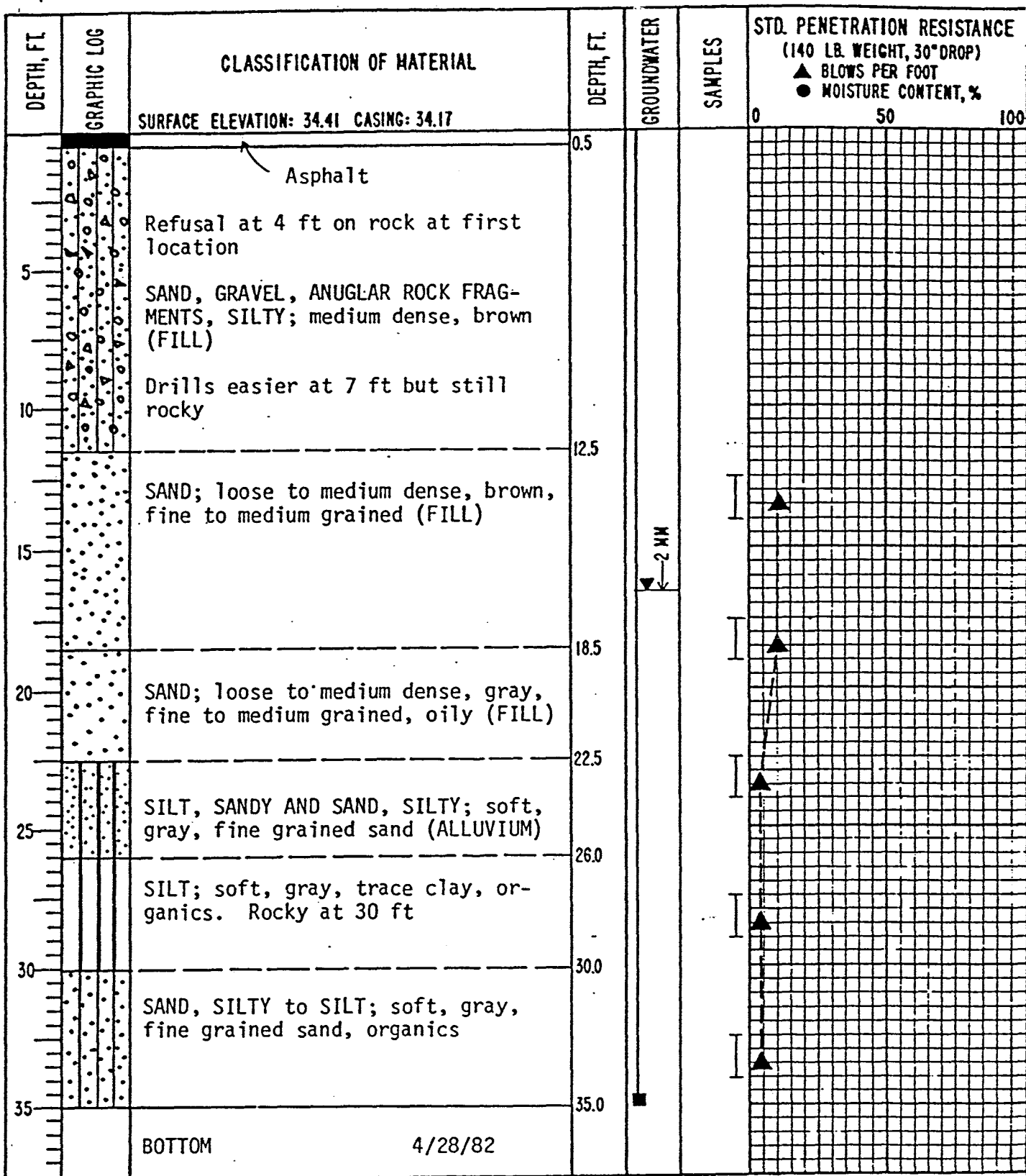


◆ TORVANE STRENGTH, TSF  
 ■ UNDRAINED SHEAR STRENGTH, TSF  
**FOUNDATION SCIENCES, INC.**  
 GEOTECHNICAL CONSULTANTS  
 PORTLAND, OREGON

BORING LOG B-7

COP0020882





### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN

\* SAMPLE NOT RECOVERED

ATTERBERG LIMITS  
- - - LIQUID LIMIT

- ▼ WATER LEVEL
- POROUS TIP

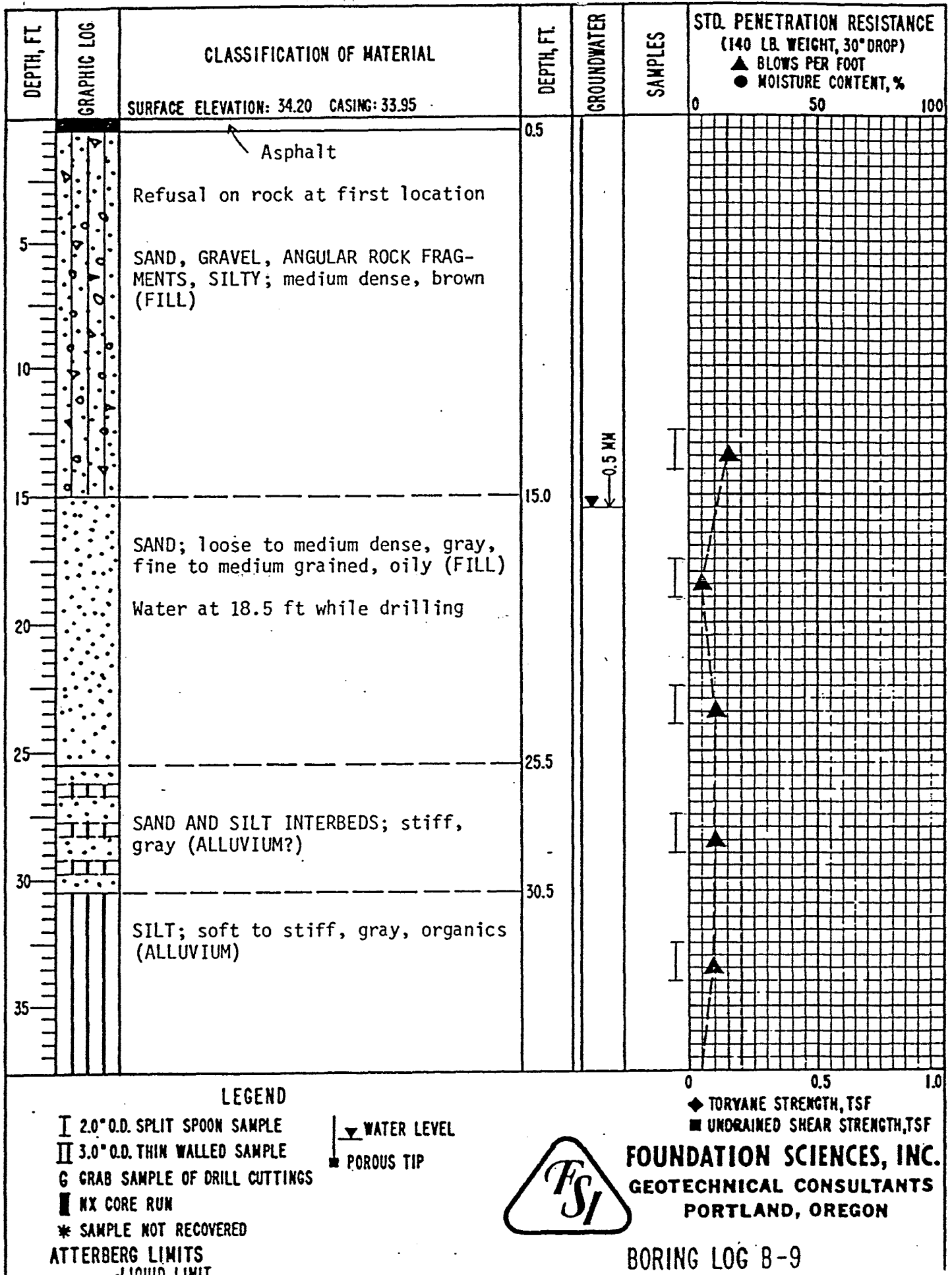


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BORING LOG B-8

- ◆ TORVANE STRENGTH, TSF
- UNDRAINED SHEAR STRENGTH, TSF

COP0020883



DEPTH, FT.	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	DEPTH, FT.	GROUNDWATER	SAMPLES	STD. PENETRATION RESISTANCE
						(140 LB. WEIGHT, 30" DROP) ▲ BLOWS PER FOOT ● MOISTURE CONTENT, %
SURFACE ELEVATION:						0 50 100
40		BOTTOM 4/28/82	40.0			

# LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN

\* SAMPLE NOT RECOVERED

ATTERBERG LIMITS

—●— LIQUID LIMIT

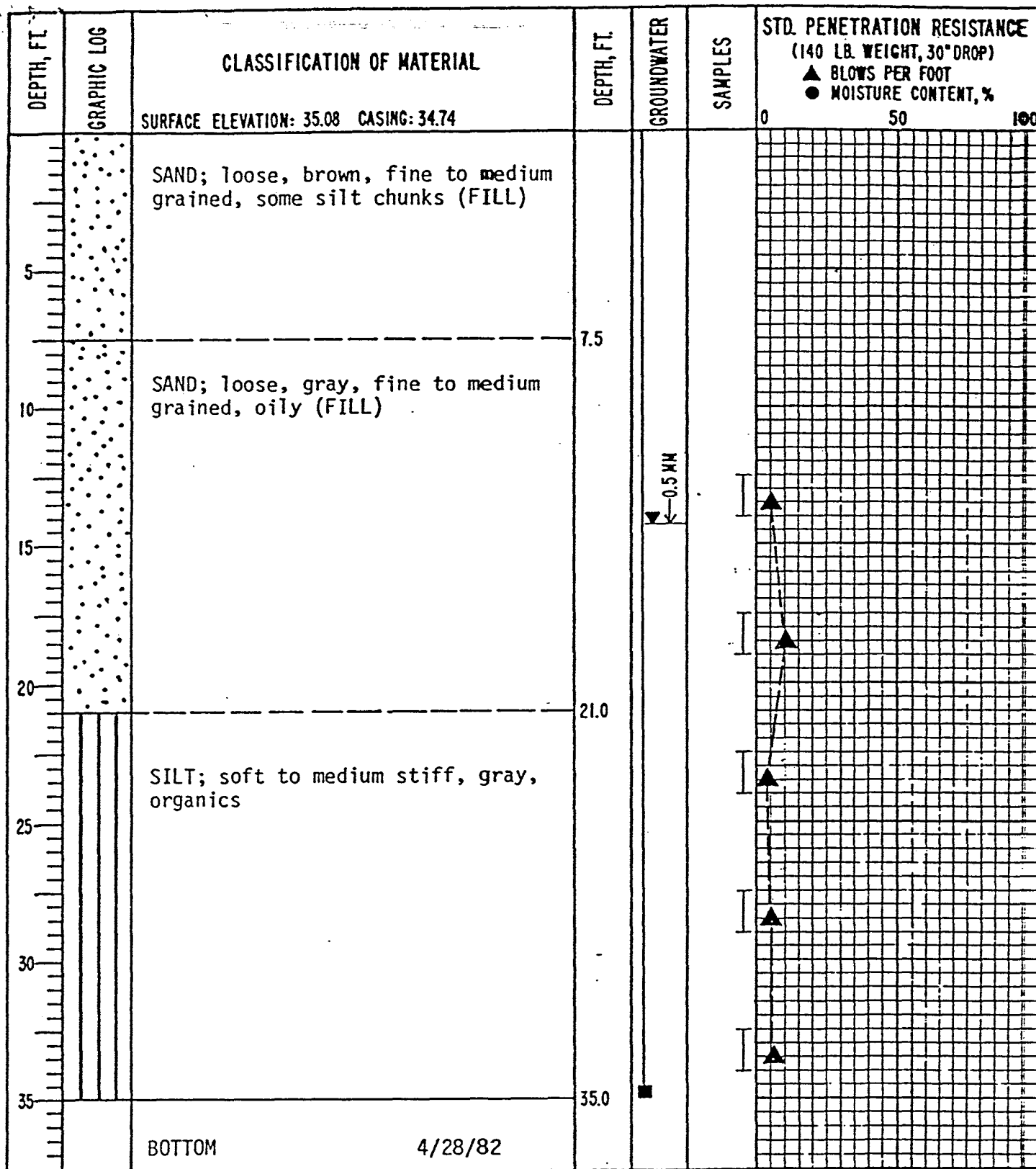
▼ WATER LEVEL  
■ POROUS TIP



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BORING LOG B-9 (CONT.)

0 0.5 1.0  
◆ TORVANE STRENGTH, TSF  
■ UNDRAINED SHEAR STRENGTH, TSF



#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

#### ATTERBERG LIMITS

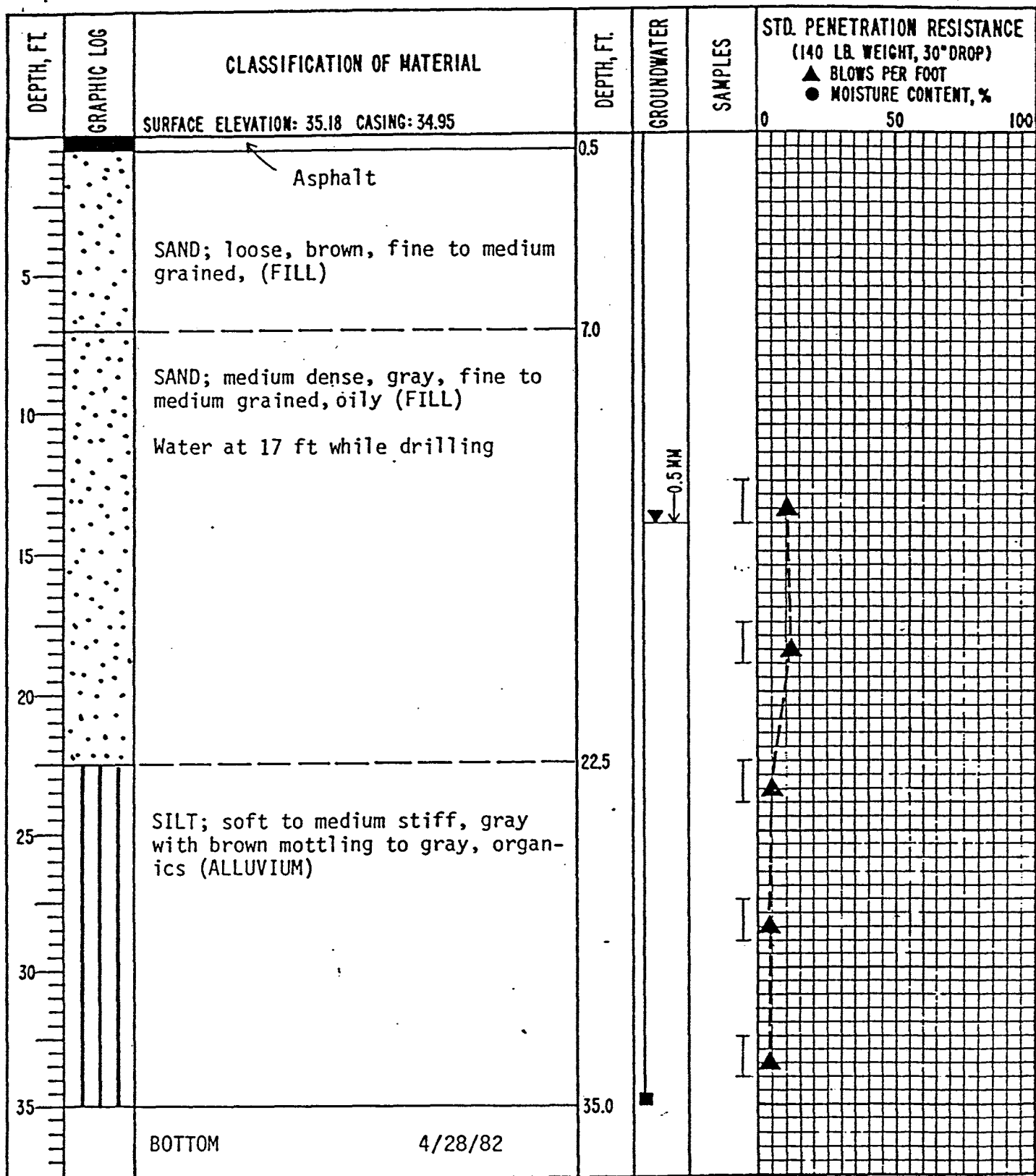
- LIQUID LIMIT
- NATURAL WATER CONTENT

- ▼ WATER LEVEL
- POROUS TIP



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BORING LOG B-10



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

ATTERBERG LIMITS  
— LIQUID LIMIT

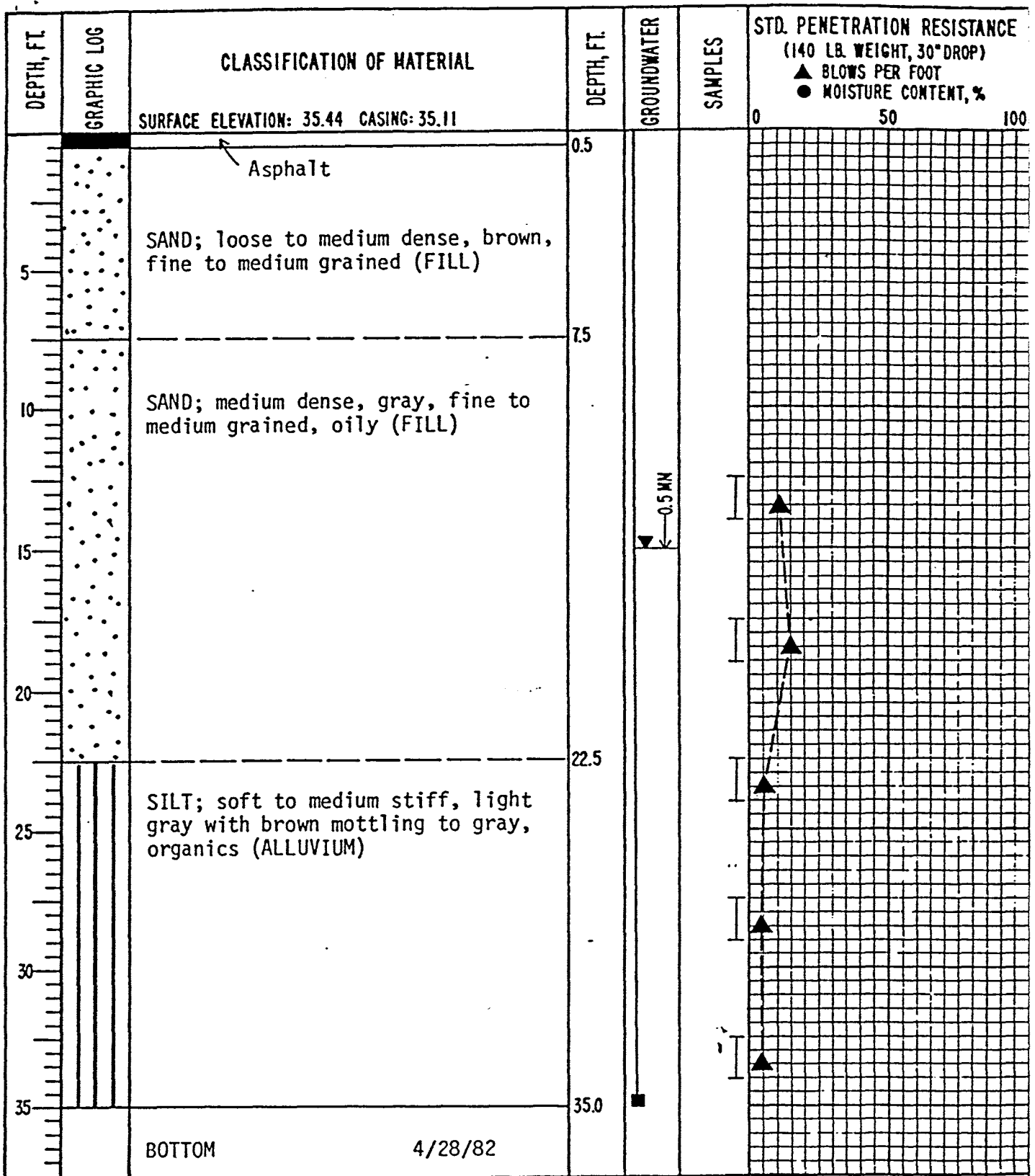
- ▼ WATER LEVEL
- POROUS TIP



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BORING LOG B-11

- ◆ TORVANE STRENGTH, TSF
- UNDRAINED SHEAR STRENGTH, TSF



**LEGEND**

I 2.0" O.D. SPLIT SPOON SAMPLE  
 II 3.0" O.D. THIN WALLED SAMPLE  
 G GRAB SAMPLE OF DRILL CUTTINGS  
 ■ NX CORE RUN  
 \* SAMPLE NOT RECOVERED  
 ATTERBERG LIMITS  
 — LIQUID LIMIT

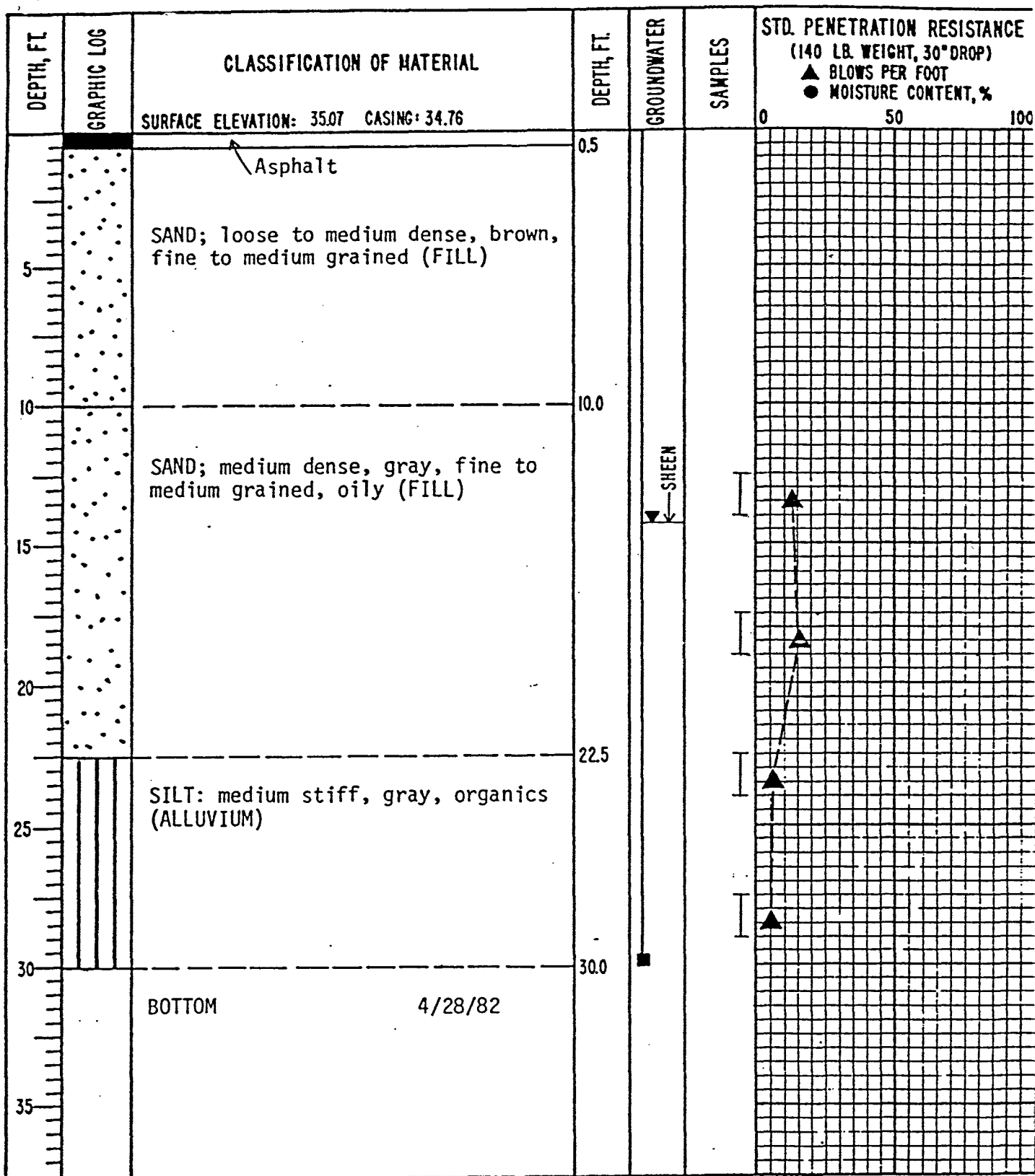
▼ WATER LEVEL  
 ■ POROUS TIP



◆ TORVANE STRENGTH, TSF  
 ■ UNDRAINED SHEAR STRENGTH, TSF

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BORING LOG B-12



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN

\* SAMPLE NOT RECOVERED

ATTERBERG LIMITS  
LIQUID LIMIT

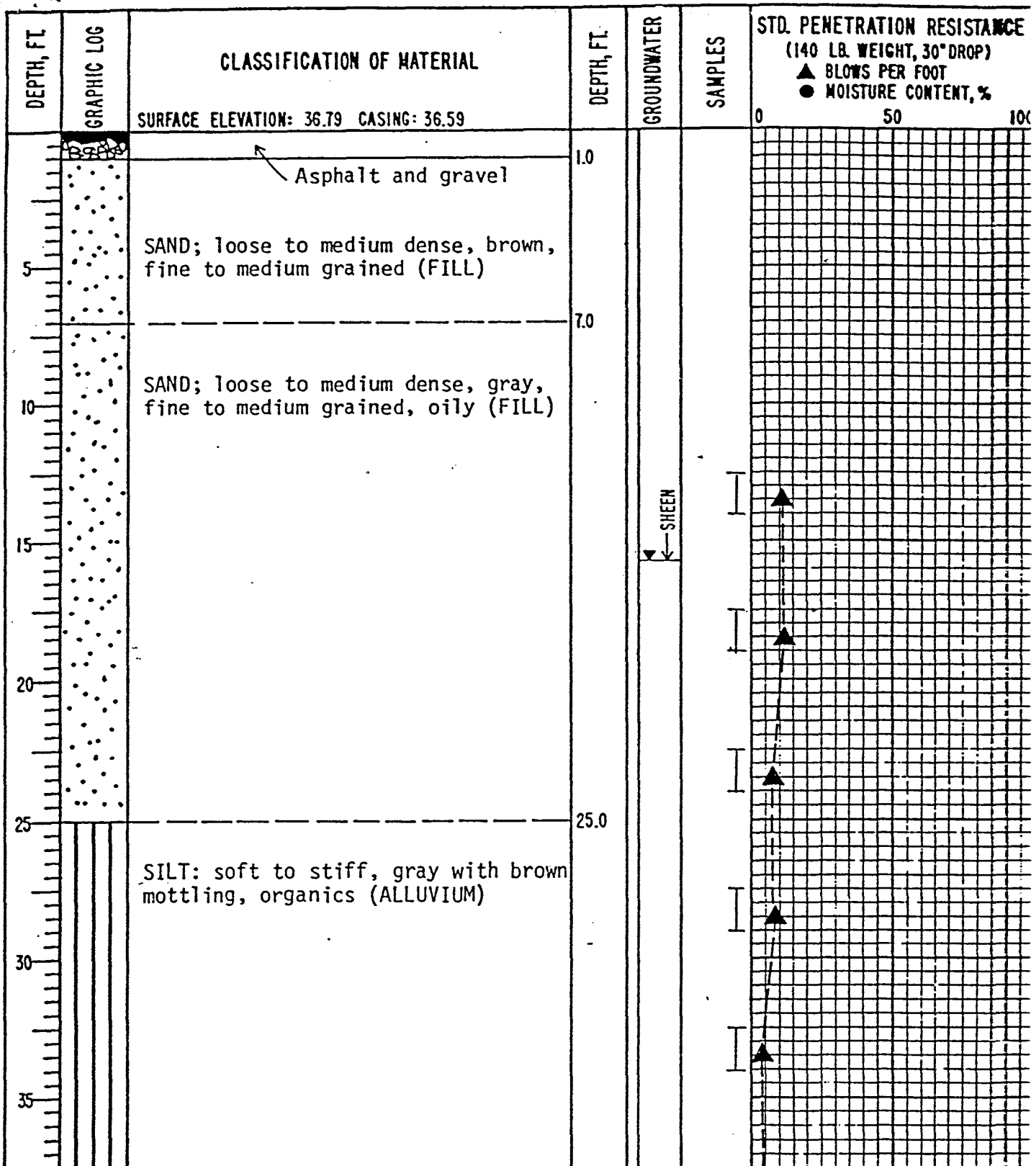
- ▼ WATER LEVEL
- POROUS TIP



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BORING LOG B-13

COP0020889



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

● LIQUID LIMIT

▼ WATER LEVEL

■ POROUS TIP



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BORING LOG B-14

COP0020890



DEPTH, FT.	GRAPHIC LOG	CLASSIFICATION OF MATERIAL	DEPTH, FT.	GROUNDWATER	SAMPLES	STD. PENETRATION RESISTANCE (140 LB. WEIGHT, 30" DROP) ▲ BLOWS PER FOOT ● MOISTURE CONTENT, %
		SURFACE ELEVATION:				0 50 100
40		BOTTOM 4/28/82	400			

### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN

\* SAMPLE NOT RECOVERED

ATTERBERG LIMITS

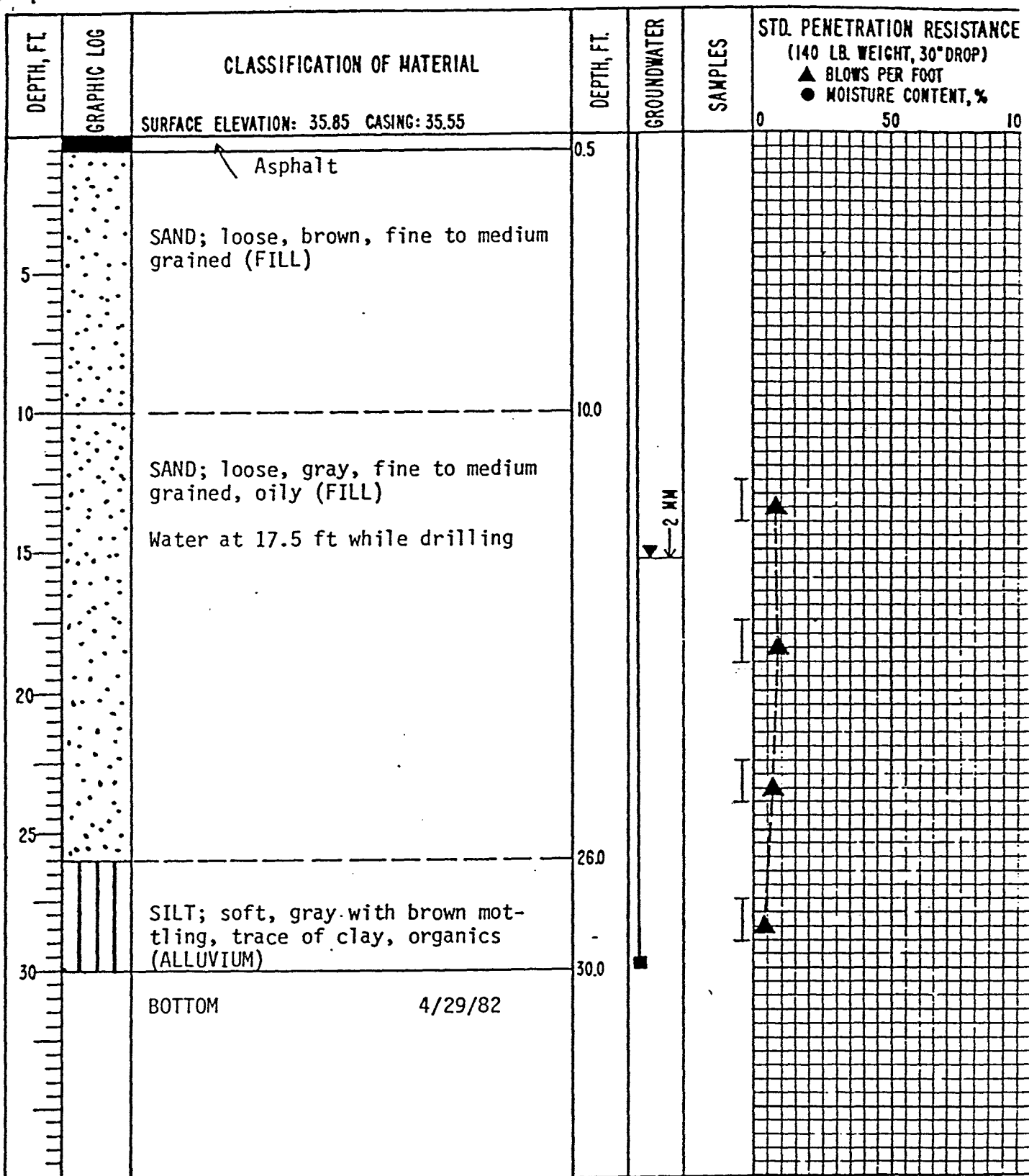
—●— LIQUID LIMIT.  
—●— NATURAL WATER CONTENT

▼ WATER LEVEL  
■ POROUS TIP



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BORING LOG B-14 (CONT.)



**LEGEND**

I 2.0" O.D. SPLIT SPOON SAMPLE  
 II 3.0" O.D. THIN WALLED SAMPLE  
 G GRAB SAMPLE OF DRILL CUTTINGS  
 ■ NX CORE RUN  
 \* SAMPLE NOT RECOVERED  
 ATTERBERG LIMITS  
 —●— LIQUID LIMIT

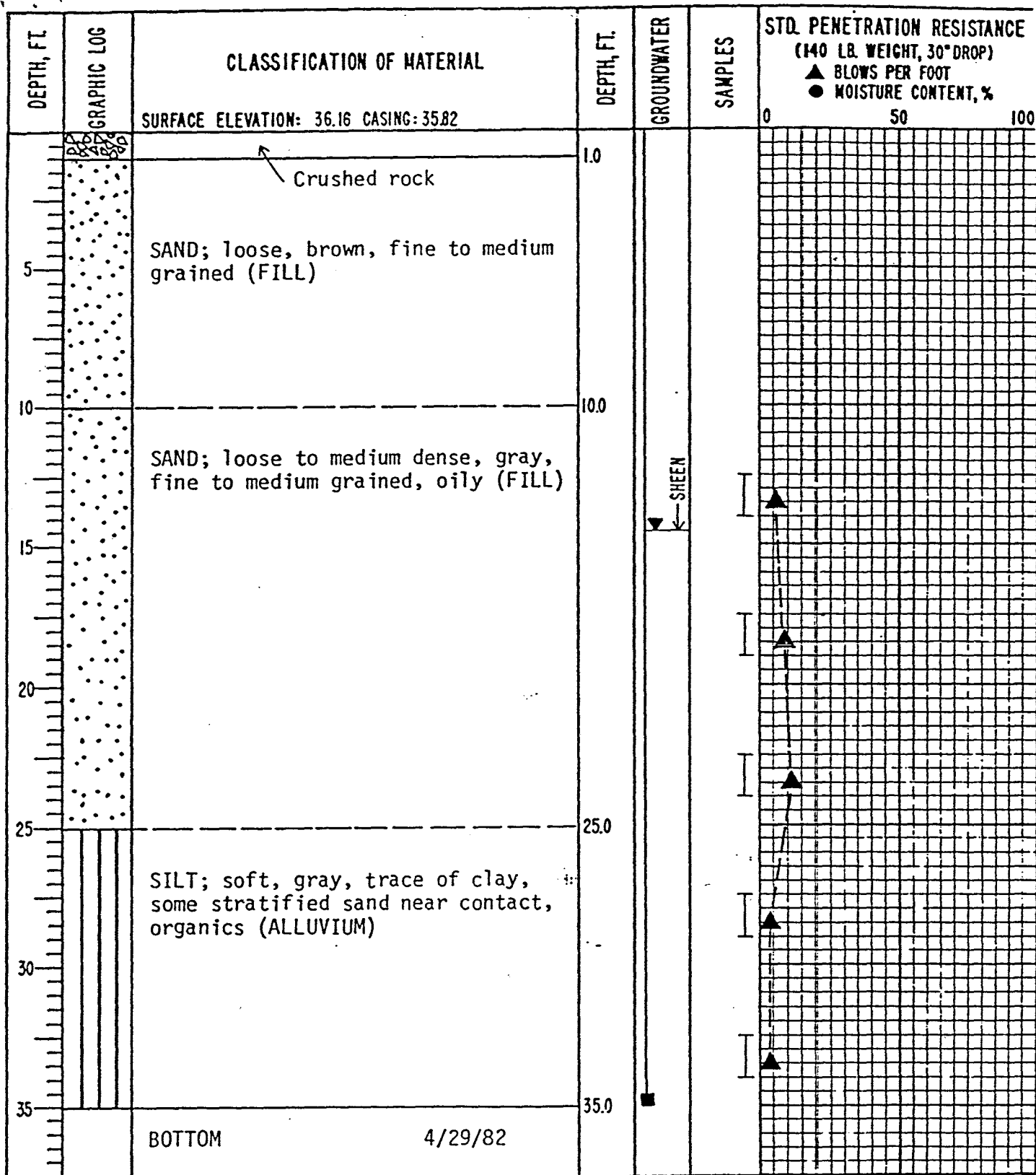
▼ WATER LEVEL  
 ■ POROUS TIP



◆ TORVANE STRENGTH, TSF  
 ■ UNDRAINED SHEAR STRENGTH, TSF  
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 PORTLAND, OREGON

BORING LOG B-15

COP0020892



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

ATTERBERG LIMITS

LIQUID LIMIT  
NATURAL WATER CONTENT

- ▼ WATER LEVEL
- POROUS TIP

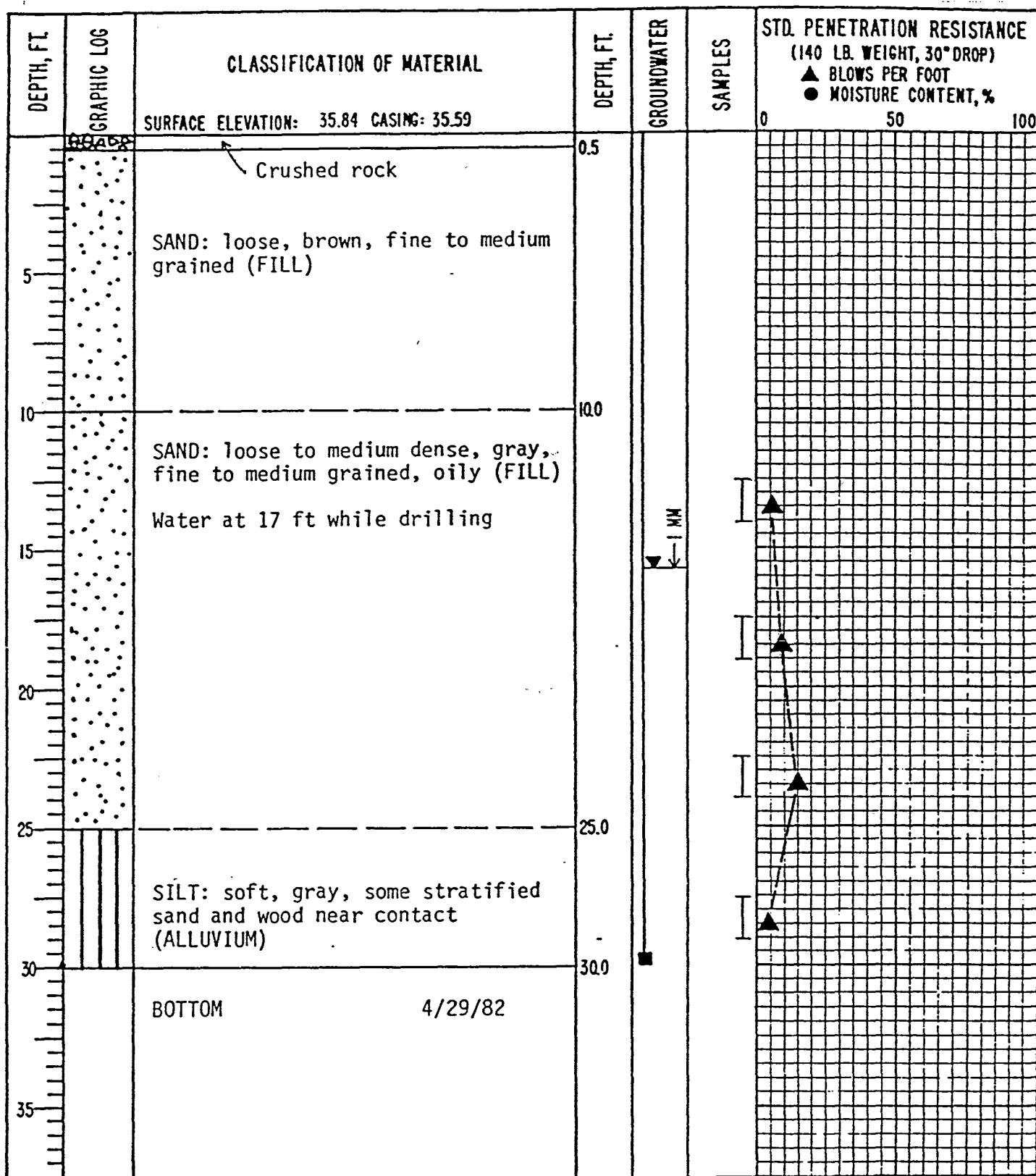


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BORING LOG B-16

- ◆ TORVANE STRENGTH, TSF
- UNDRAINED SHEAR STRENGTH, TSF

COP0020893



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

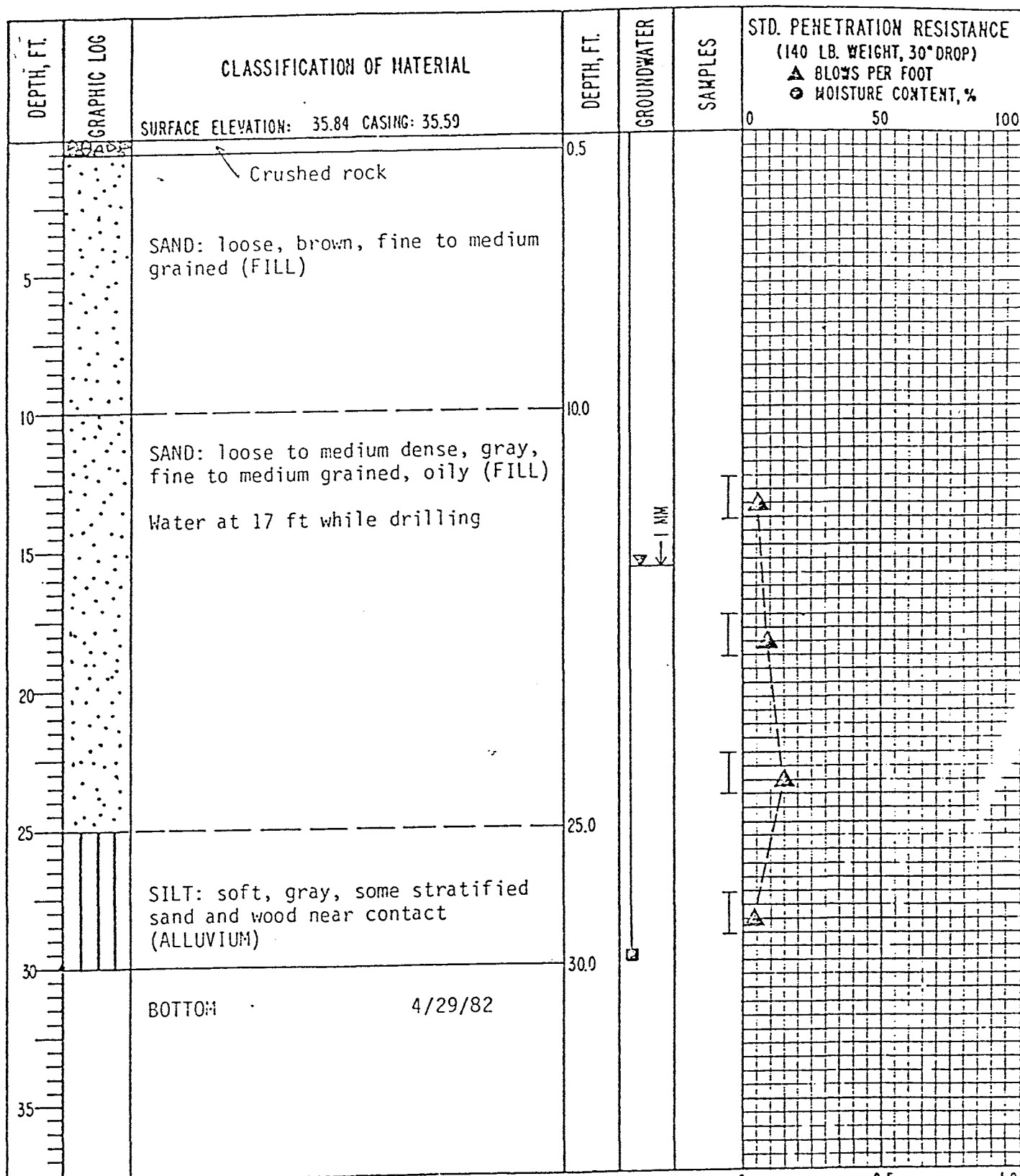
ATTERBERG LIMITS  
— LIQUID LIMIT

- ▼ WATER LEVEL
- POROUS TIP



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BORING LOG B-17



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP



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PORTLAND, OREGON

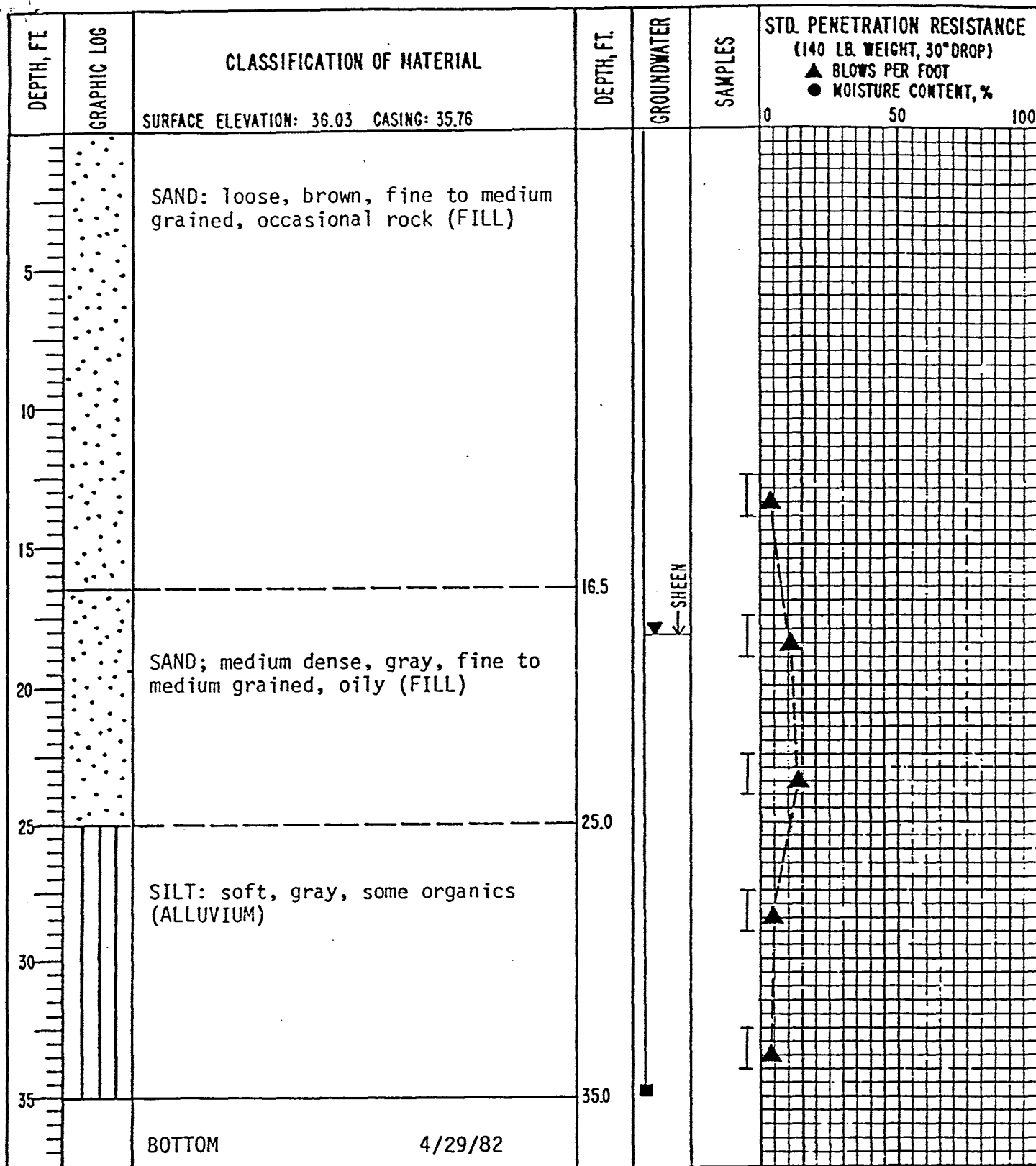
### BORING LOG B-17

DATE MAY 1982

JOB NO. 210-1

FIG. 20

COP0020895



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN

\* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP



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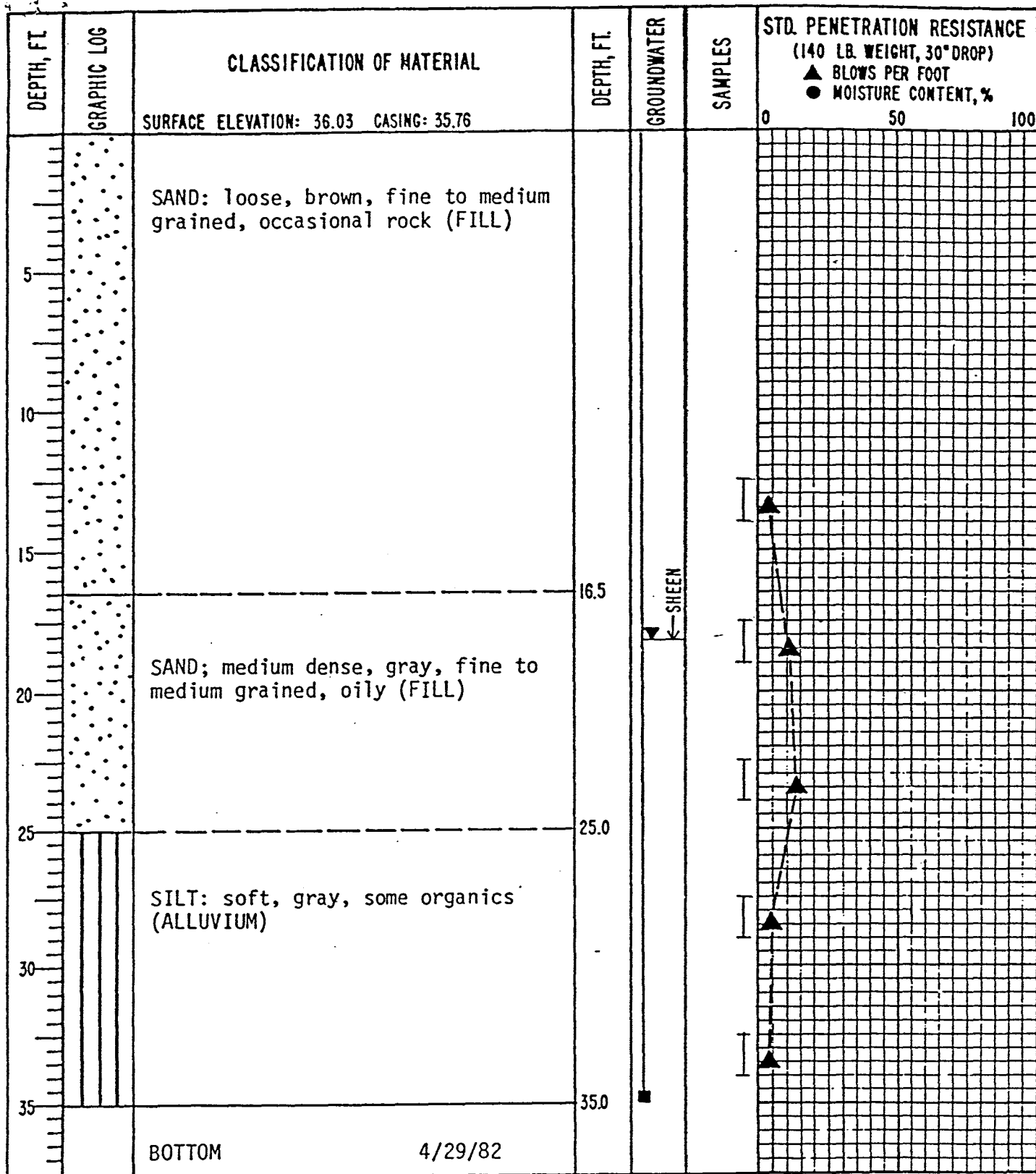
### BORING LOG B-18

DATE MAY 1982

JOB NO. 210-1

FIG. 21

COP0020896



#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN

\* SAMPLE NOT RECOVERED

#### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT

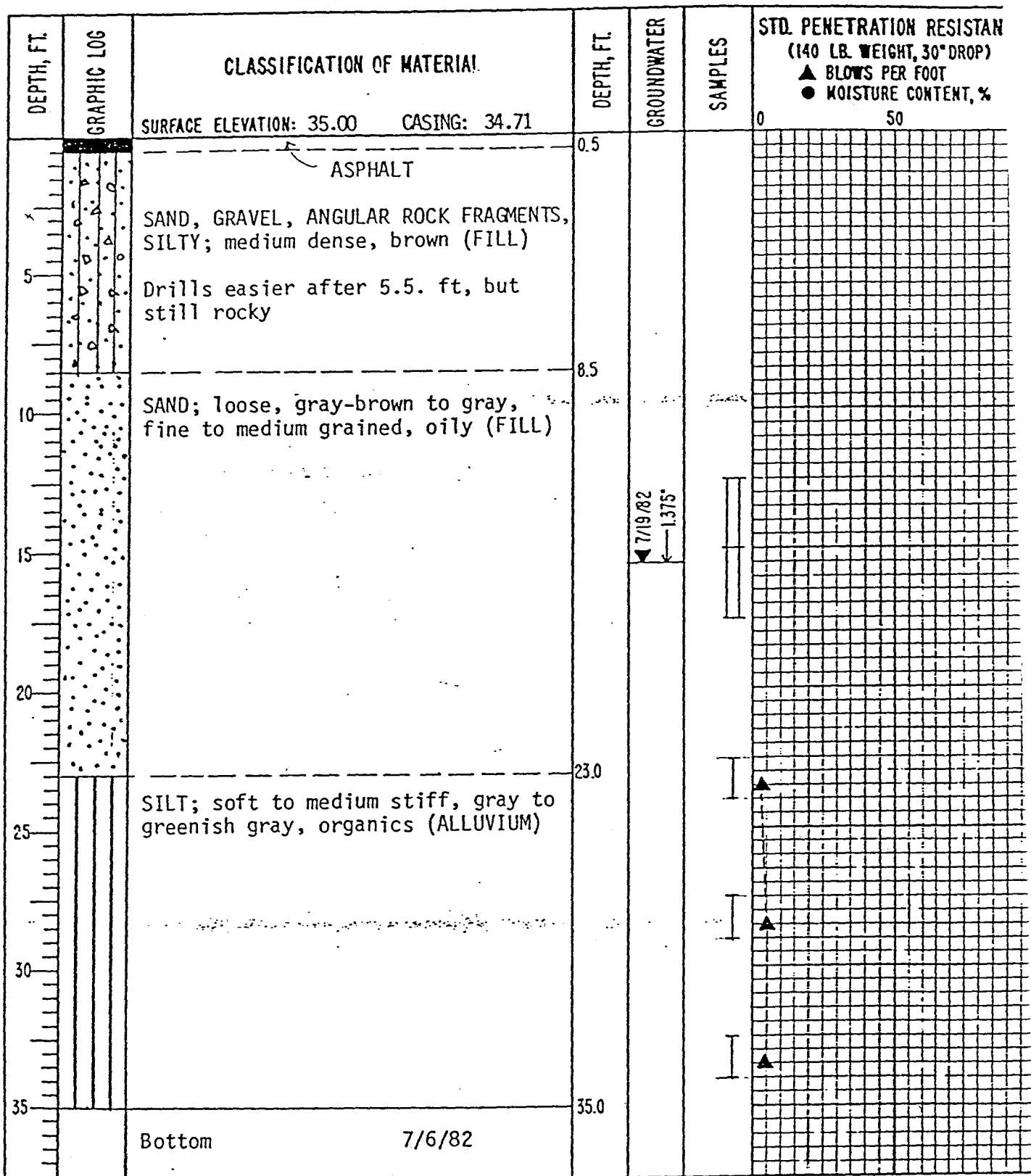
- ▼ WATER LEVEL
- POROUS TIP



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BORING LOG B-18

- ◆ TORVANE STRENGTH, TSF
- UNDRAINED SHEAR STRENGTH, TSF



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



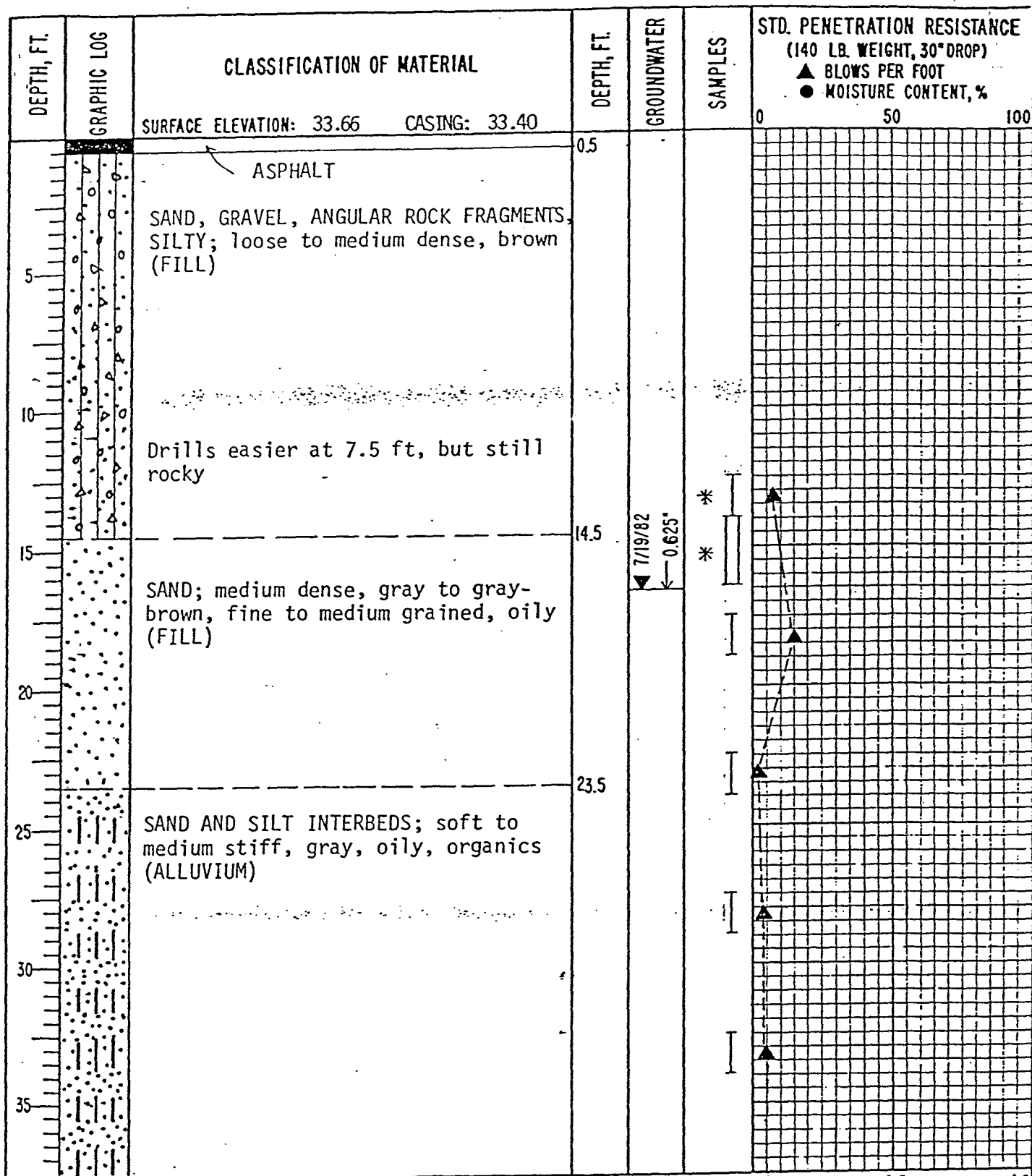
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**BORING LOG B-19**

DATE JULY, 1982 JOB NO. 20-1-2 FIG.

COP002089





### LEGEND

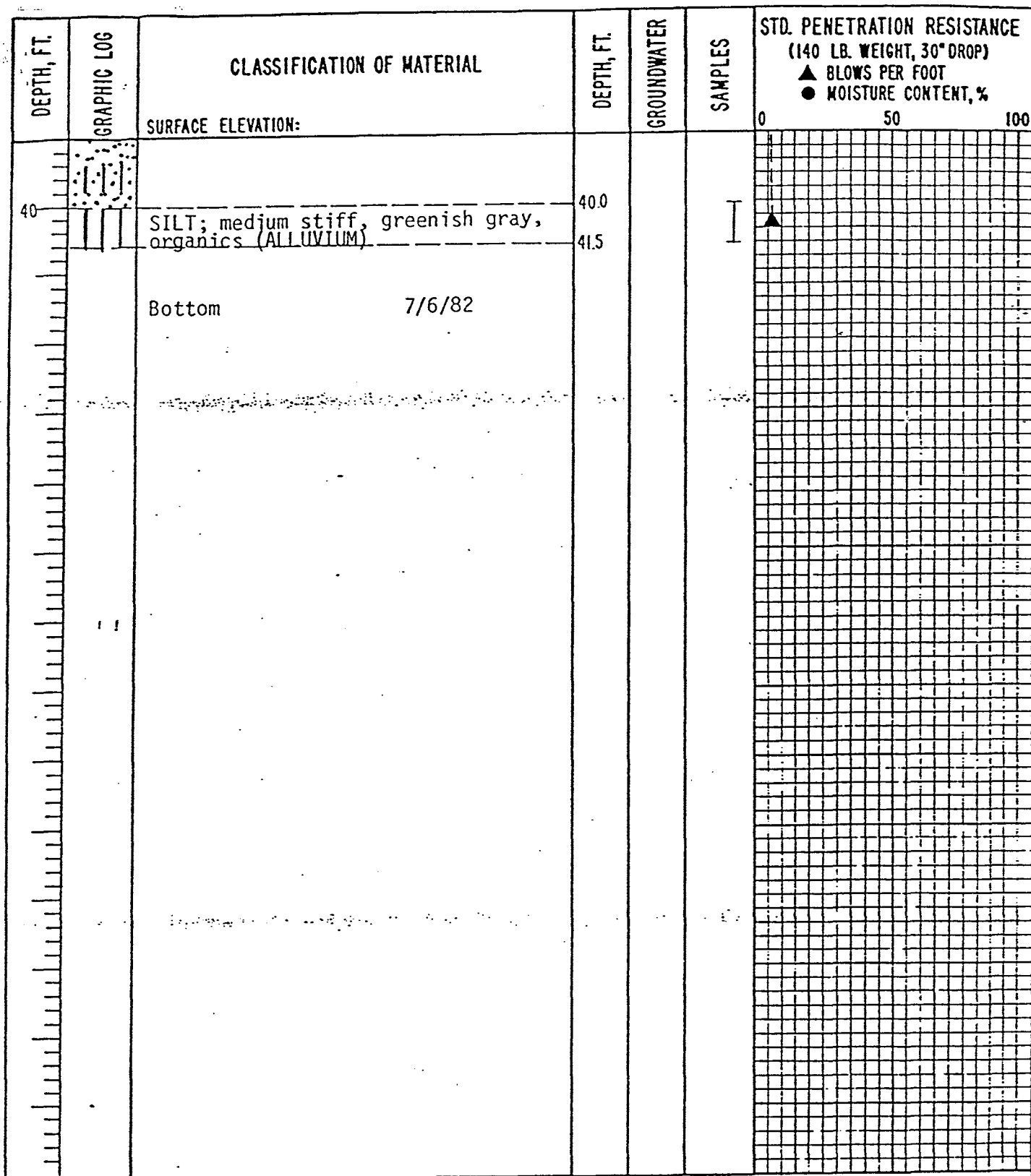
- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
  - LIQUID LIMIT
  - NATURAL WATER CONTENT
  - PLASTIC LIMIT
- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNRAINED SHEAR STRENGTH (TSF)



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**BORING LOG B-20**

DATE JULY, 1982 JOB NO. 210-1-2 FIG.



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN

\* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

▼ WATER LEVEL

■ POROUS TIP

◆ TORVANE STRENGTH  
TONS/SQ. FT. (TSF)

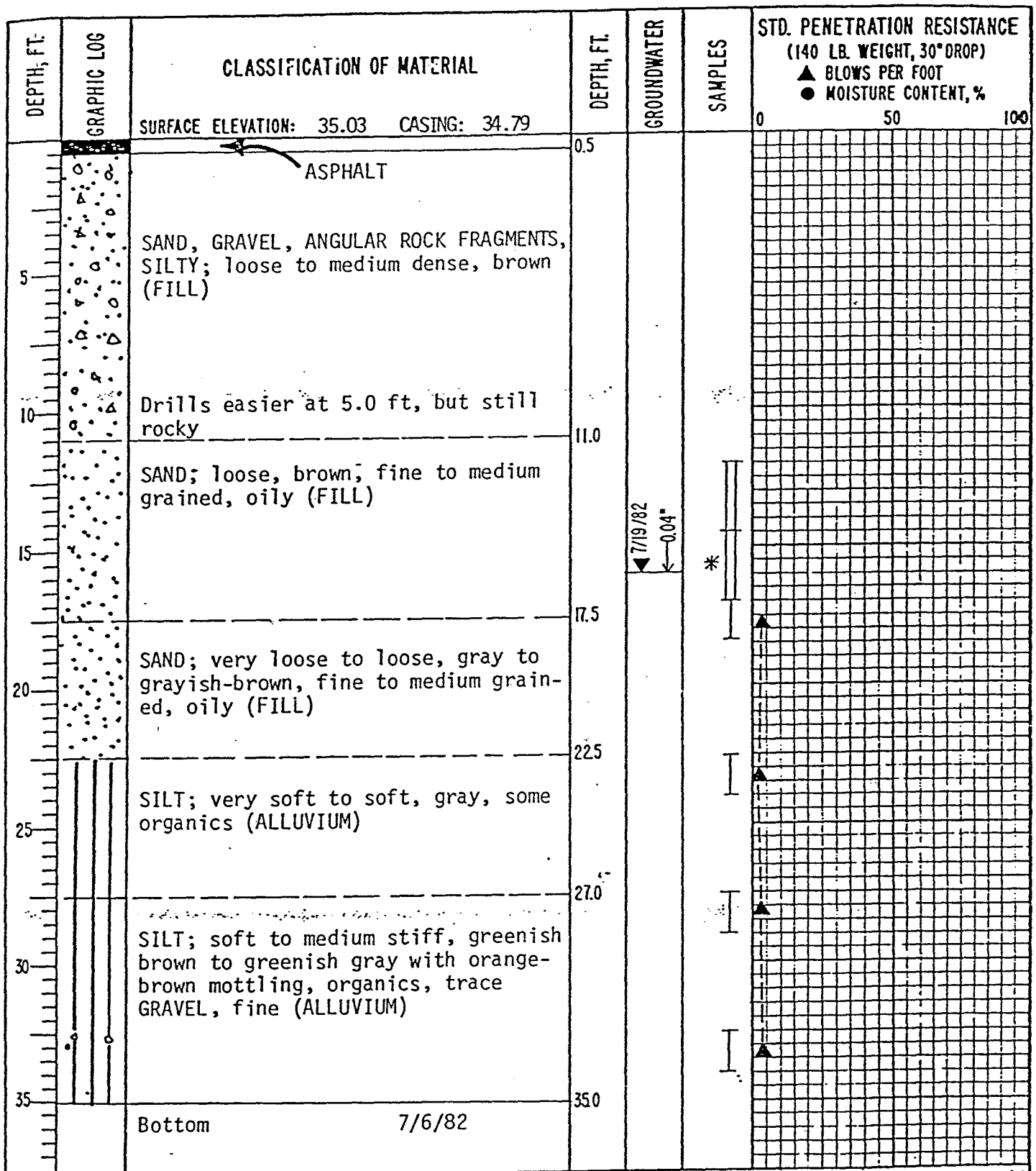
■ UNDRAINED SHEAR  
STRENGTH (TSF)



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**BORING LOG B-20 (CONT.)**

DATE JULY, 1982 JOB NO. 210-1-2 FIG.



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ.FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



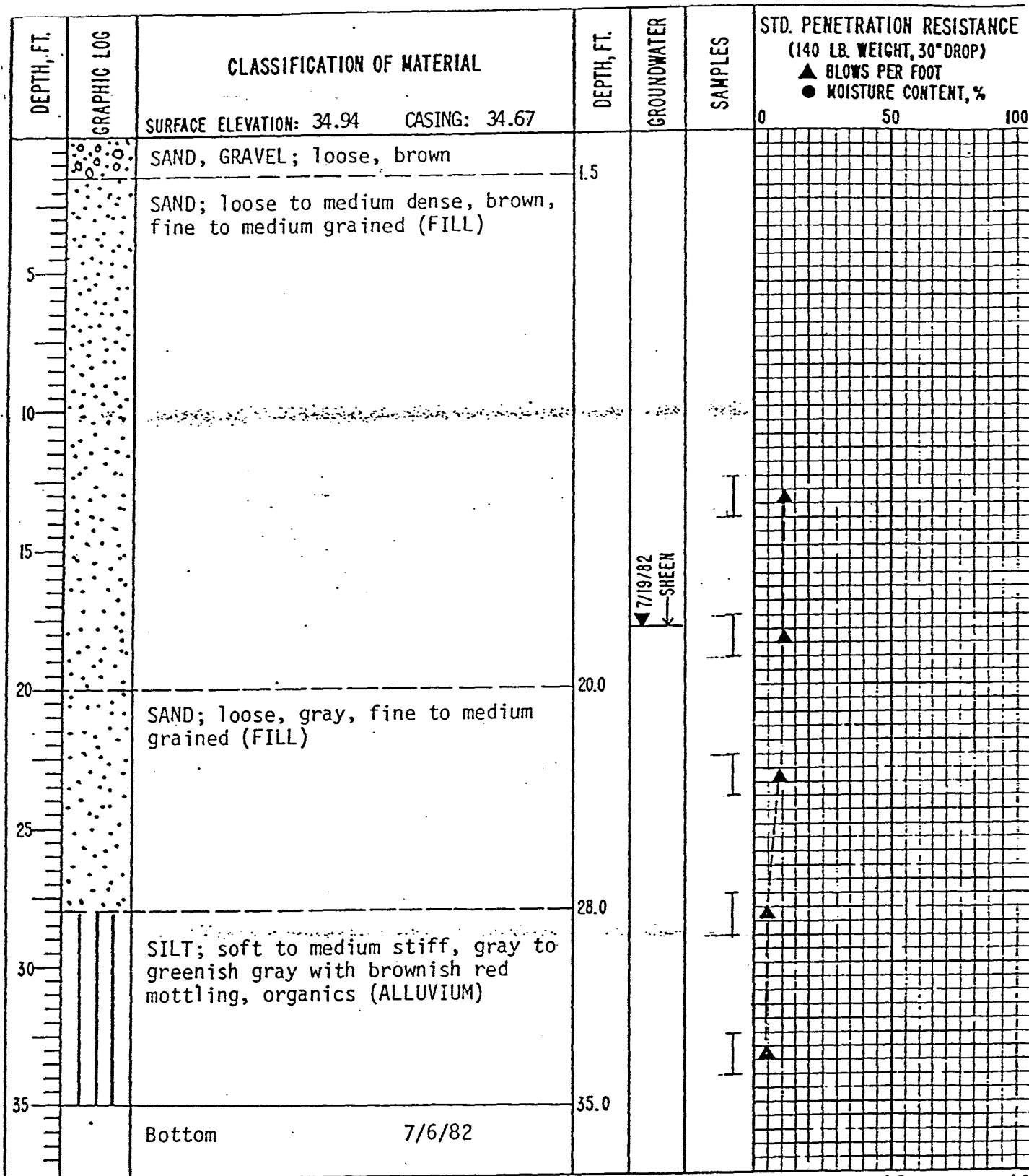
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**BORING LOG B-21**

DATE JULY, 1982

JOB NO. 210-1-2

FIG.



# LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

ATTERBERG LIMITS

● LIQUID LIMIT

○ NATURAL WATER CONTENT

— PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)

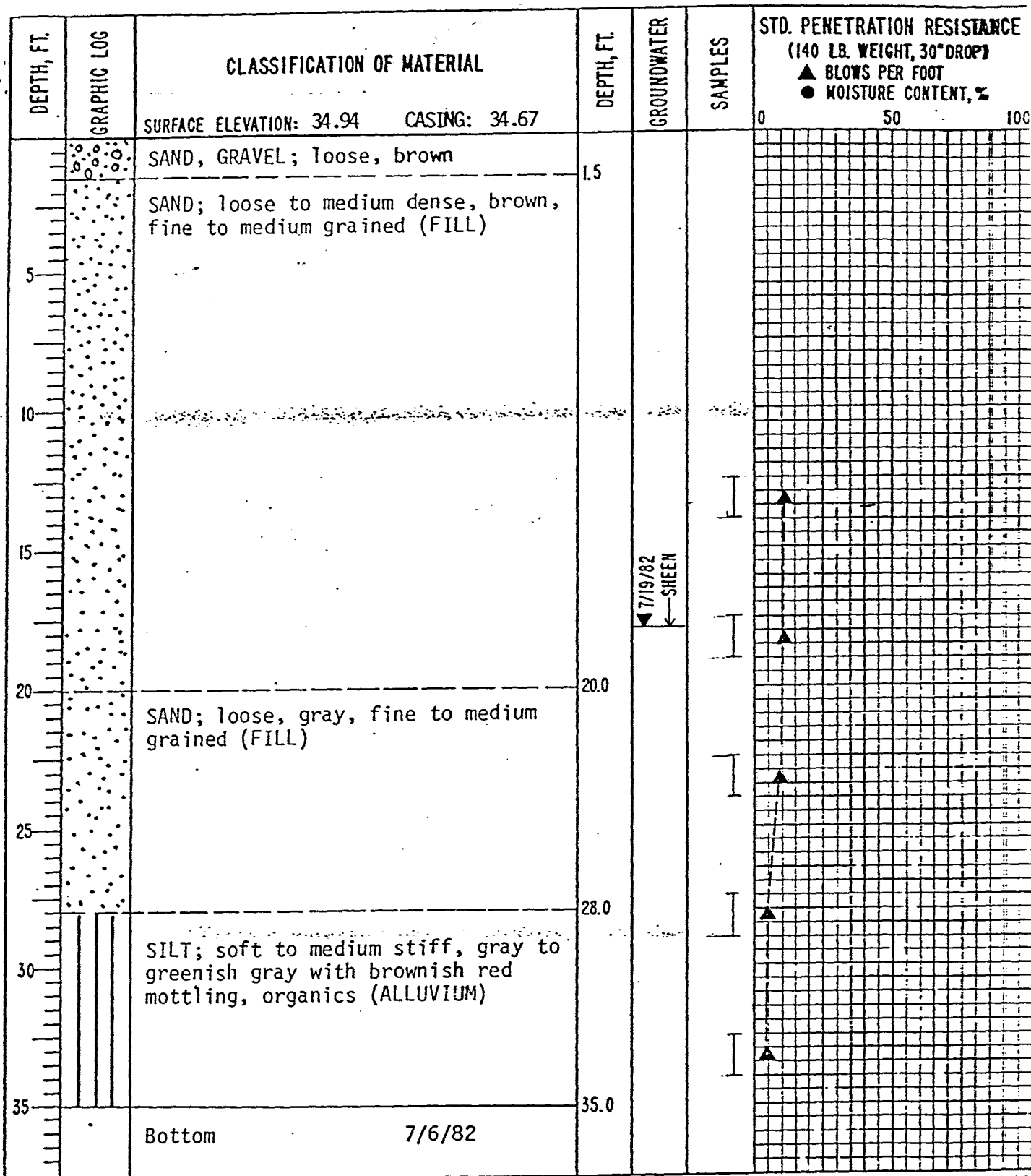


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**BORING LOG B-22**

DATE JULY, 1982 JOB NO. 20-1-2

FIG.



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

ATTERBERG LIMITS  
 — LIQUID LIMIT  
 — NATURAL WATER CONTENT  
 — PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



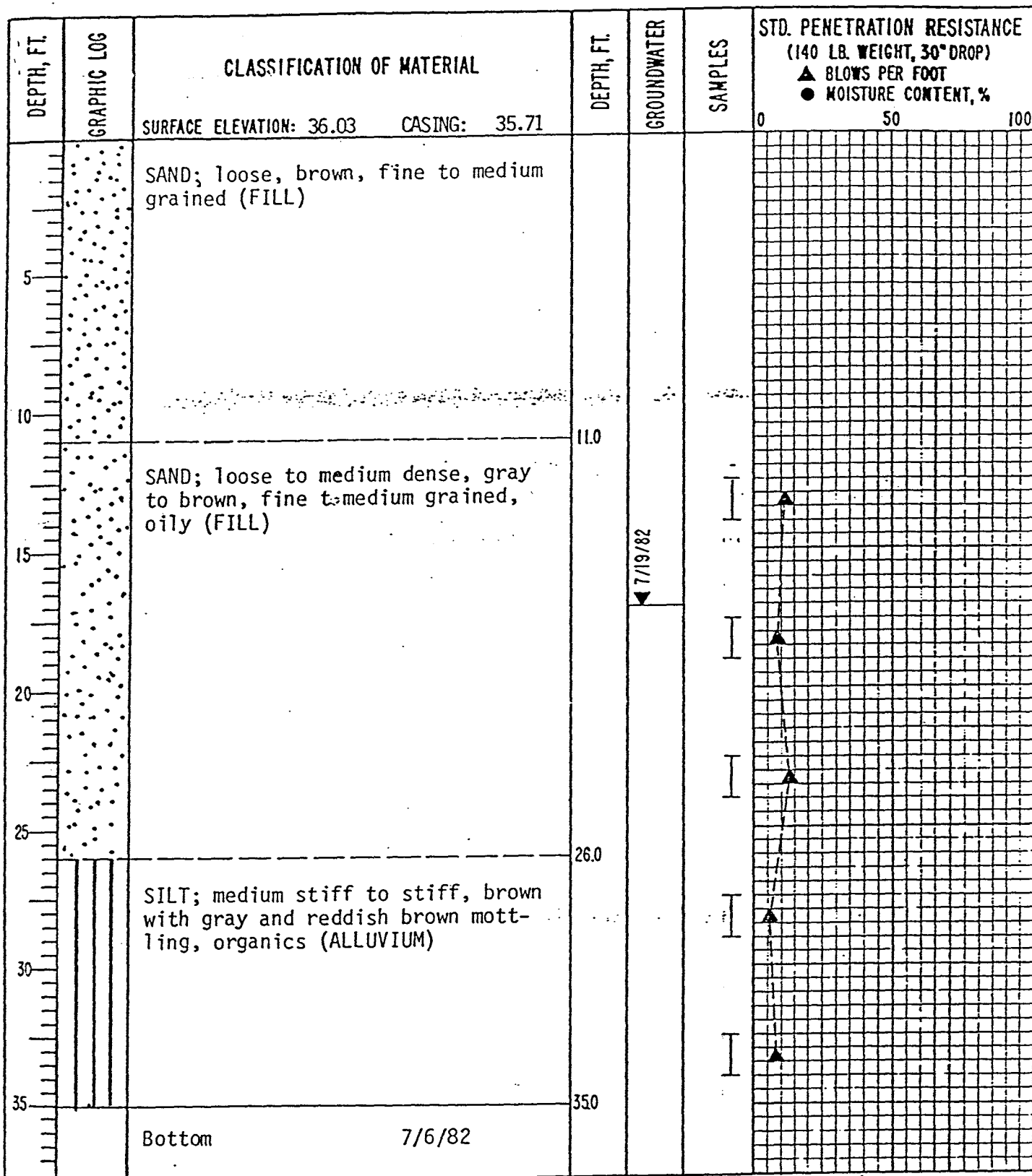
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**BORING LOG B-22**

DATE JULY, 1982 JOB NO. 20-1-2

FIG.

COP002090



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



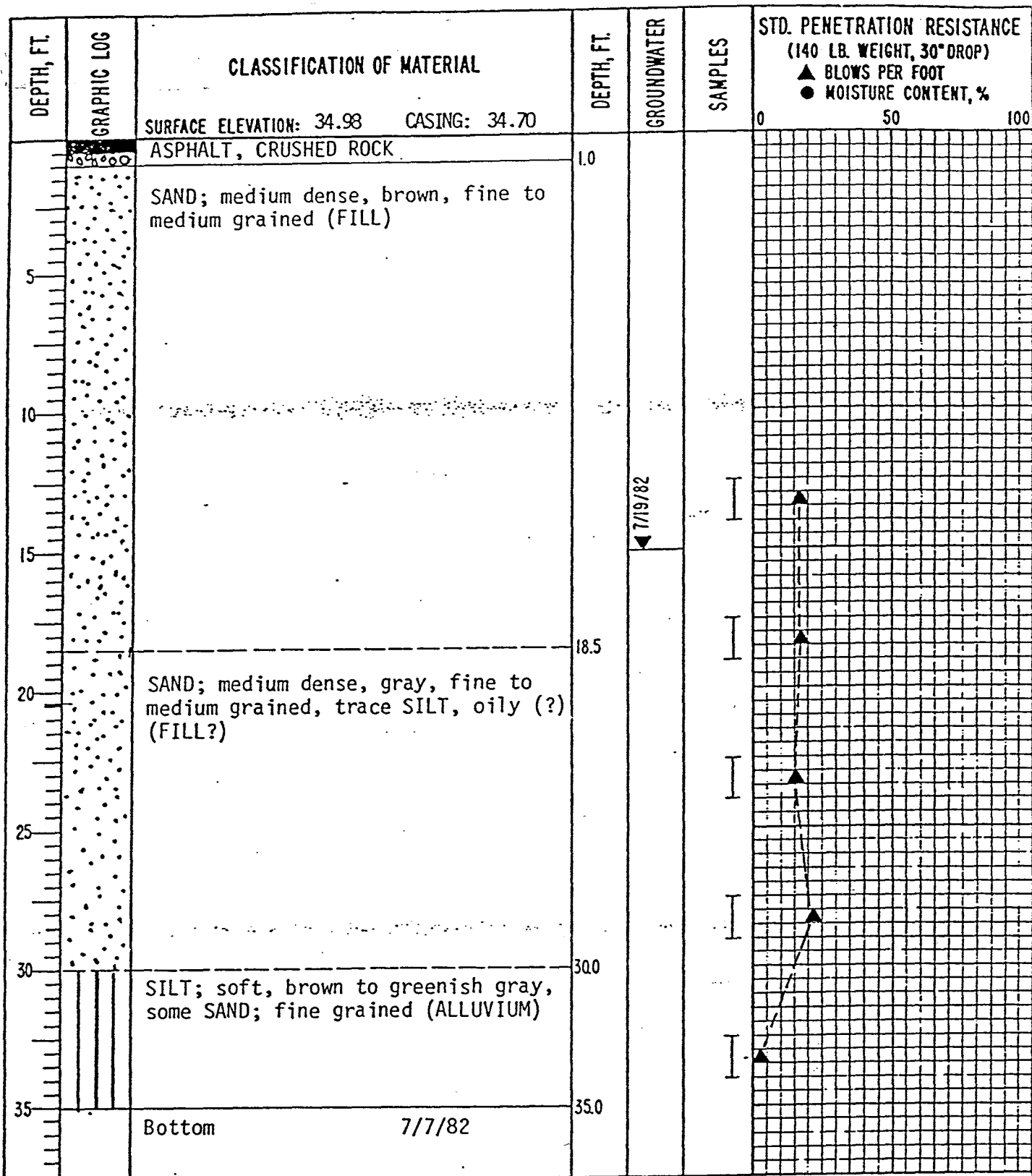
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**BORING LOG B-23**

DATE JULY, 1982

JOB NO. 210-1-2

FIG.



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

ATTERBERG LIMITS  
 — LIQUID LIMIT  
 — NATURAL WATER CONTENT  
 — PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



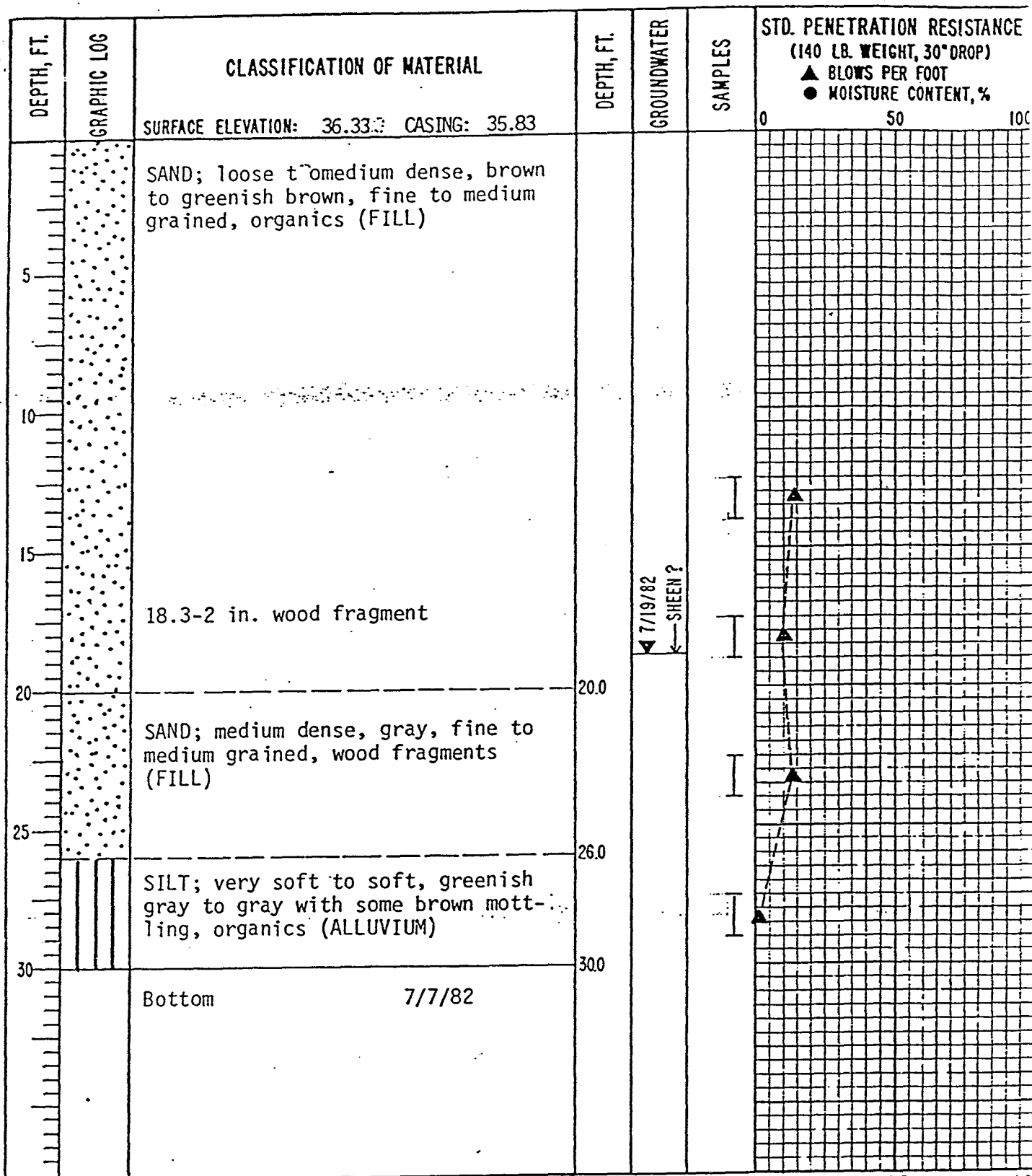
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**BORING LOG B-24**

DATE JUL, 1982

JOB NO. 210-1-2

FIG.



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

ATTERBERG LIMITS  
 ● LIQUID LIMIT  
 — NATURAL WATER CONTENT  
 — PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNRAINED SHEAR STRENGTH (TSF)



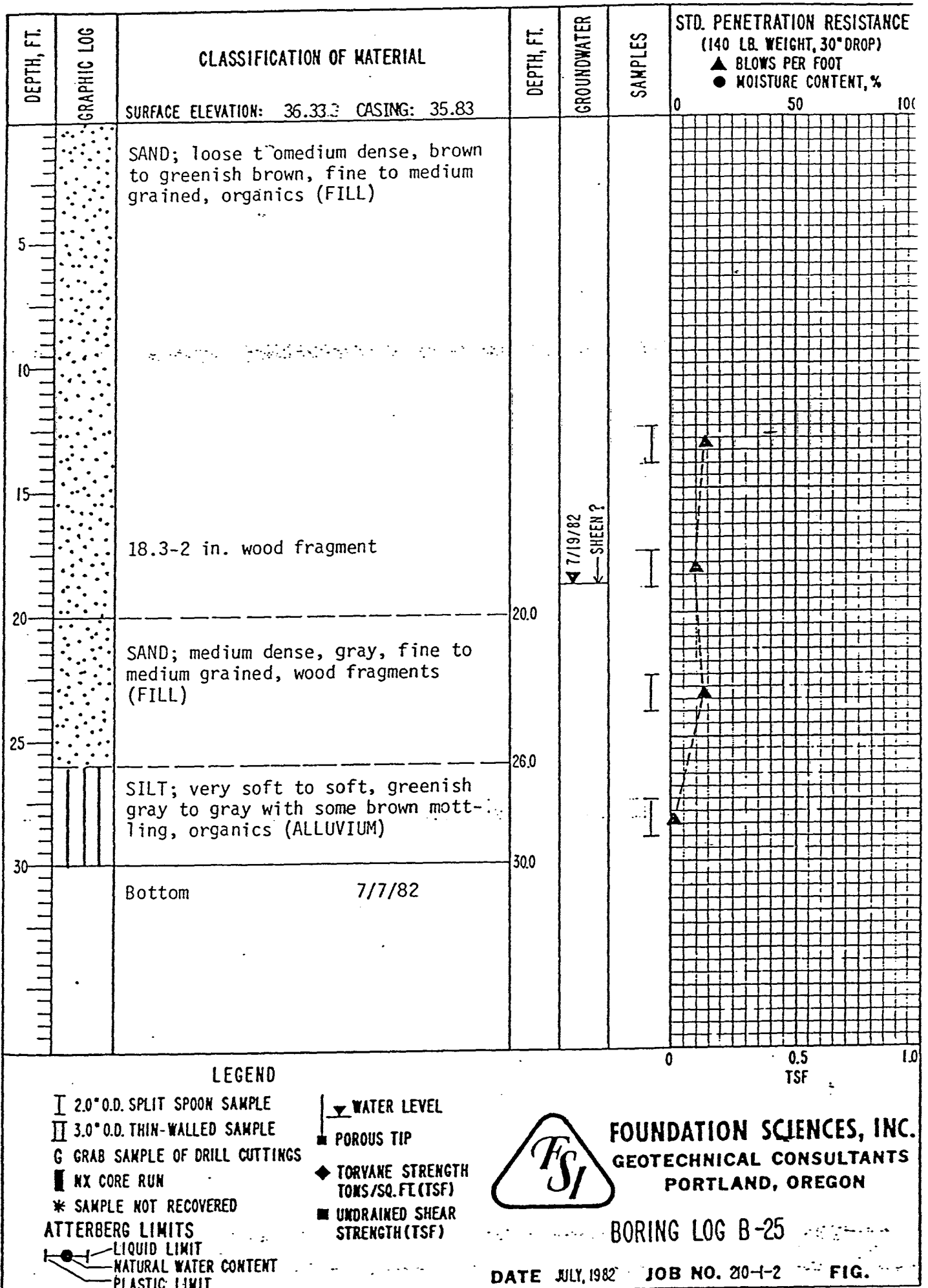
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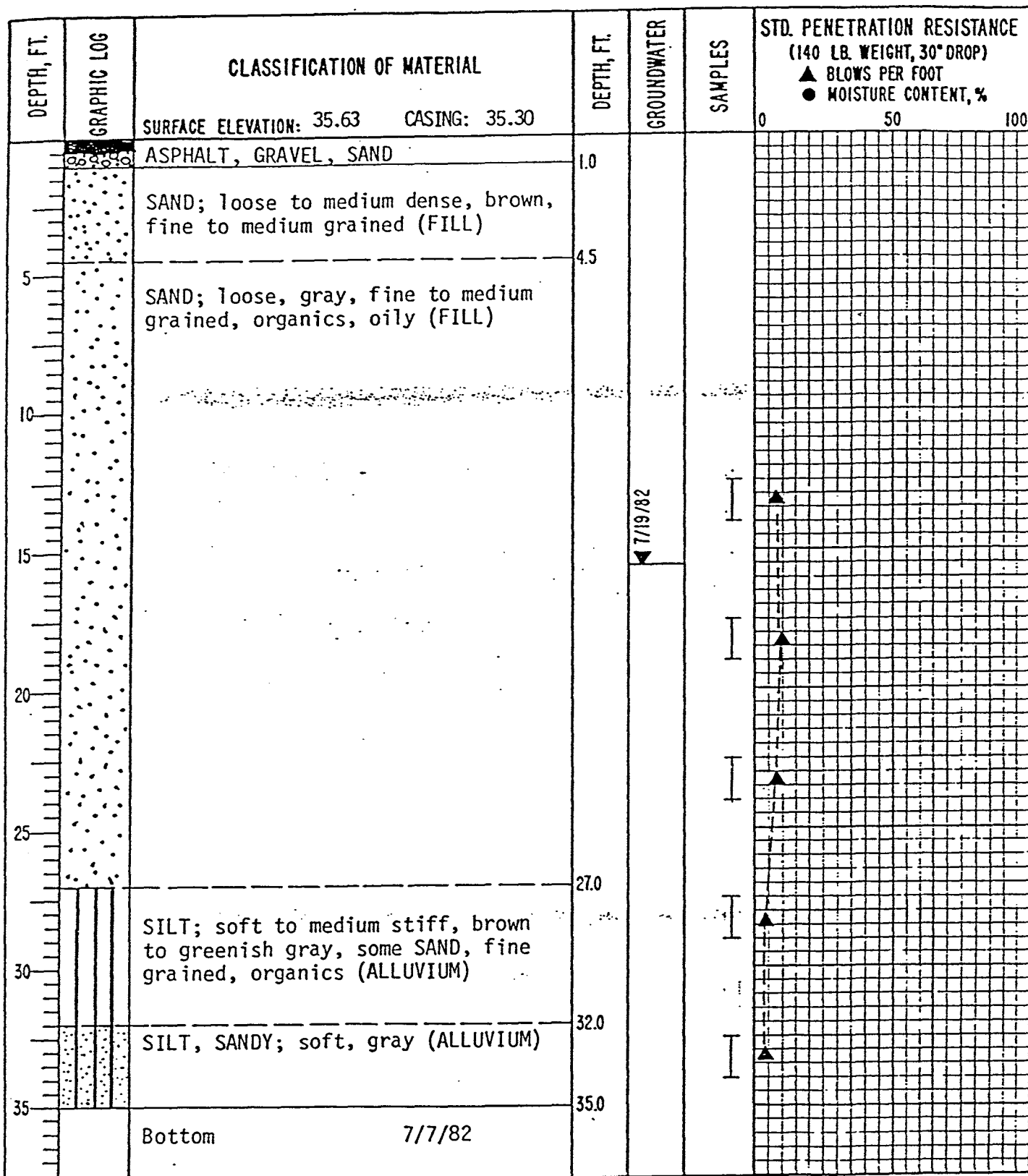
**BORING LOG B-25**

DATE JULY, 1982 JOB NO. 210-1-2 FIG.

COP0020906







### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH  
TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR  
STRENGTH (TSF)



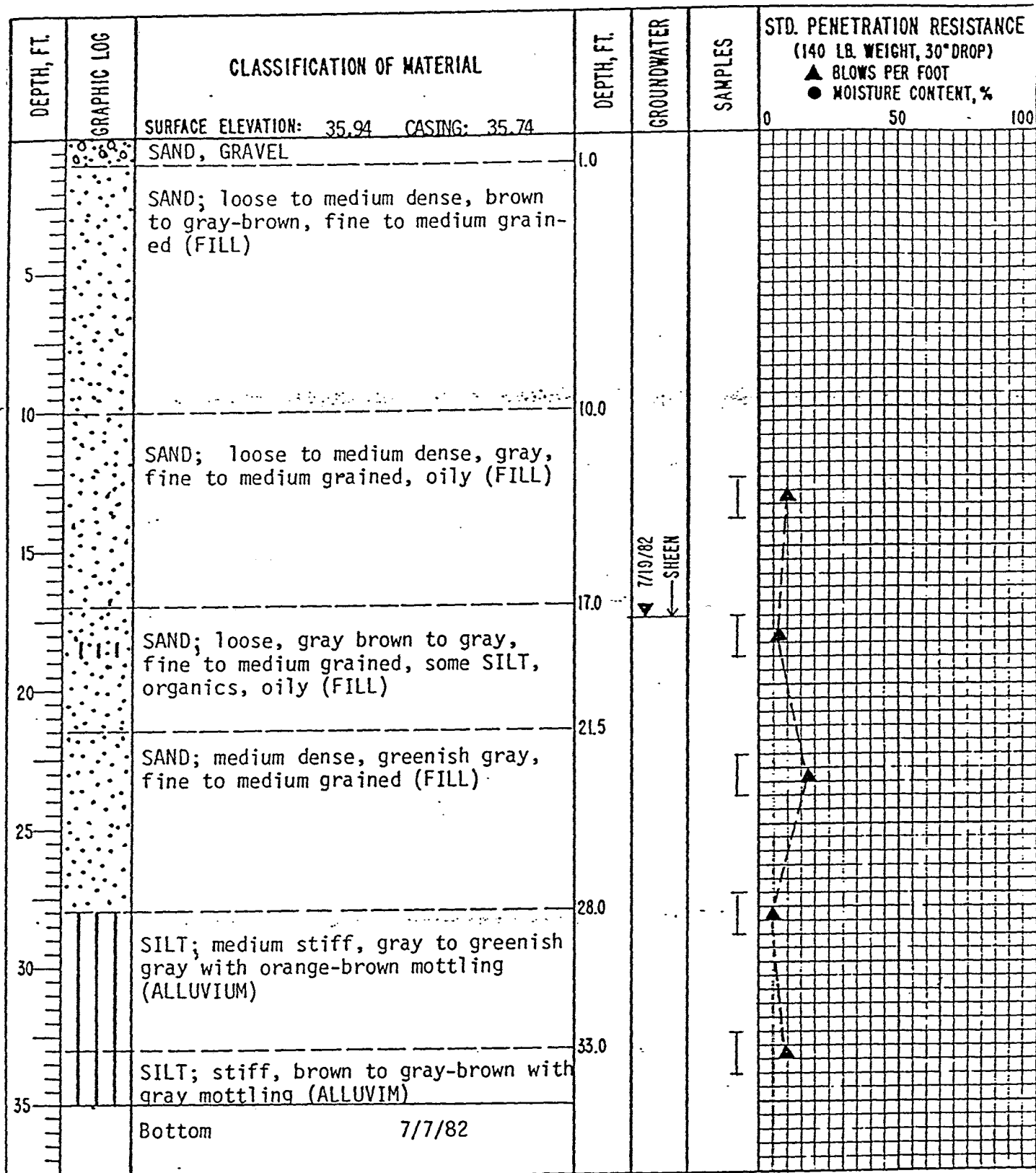
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**BORING LOG B-26**

DATE JULY, 1982

JOB NO. 210-1-2

FIG.



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



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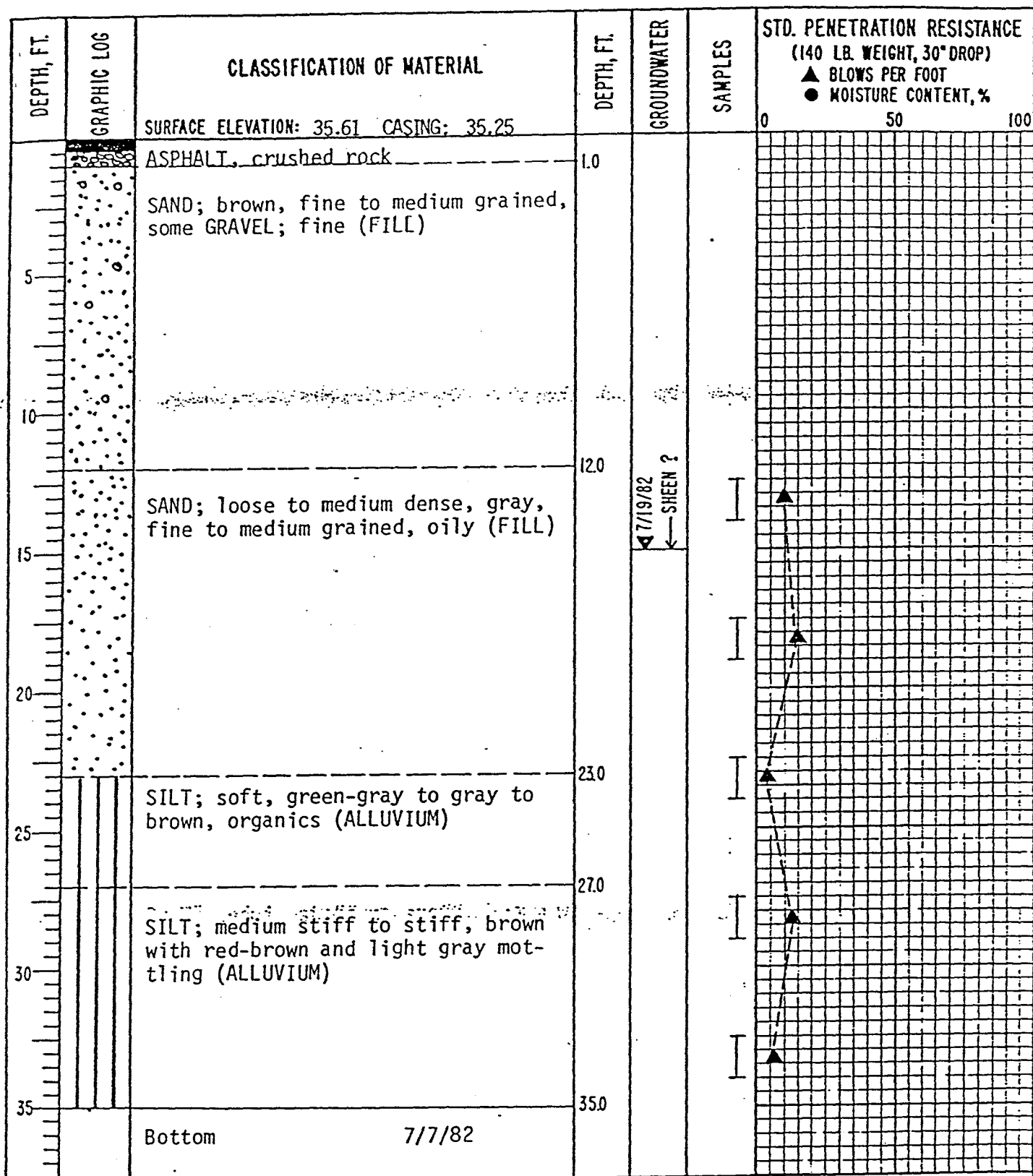
**BORING LOG B-27**

DATE JULY, 1982

JOB NO. 210-1-2

FIG.

COP002090



### LEGEND

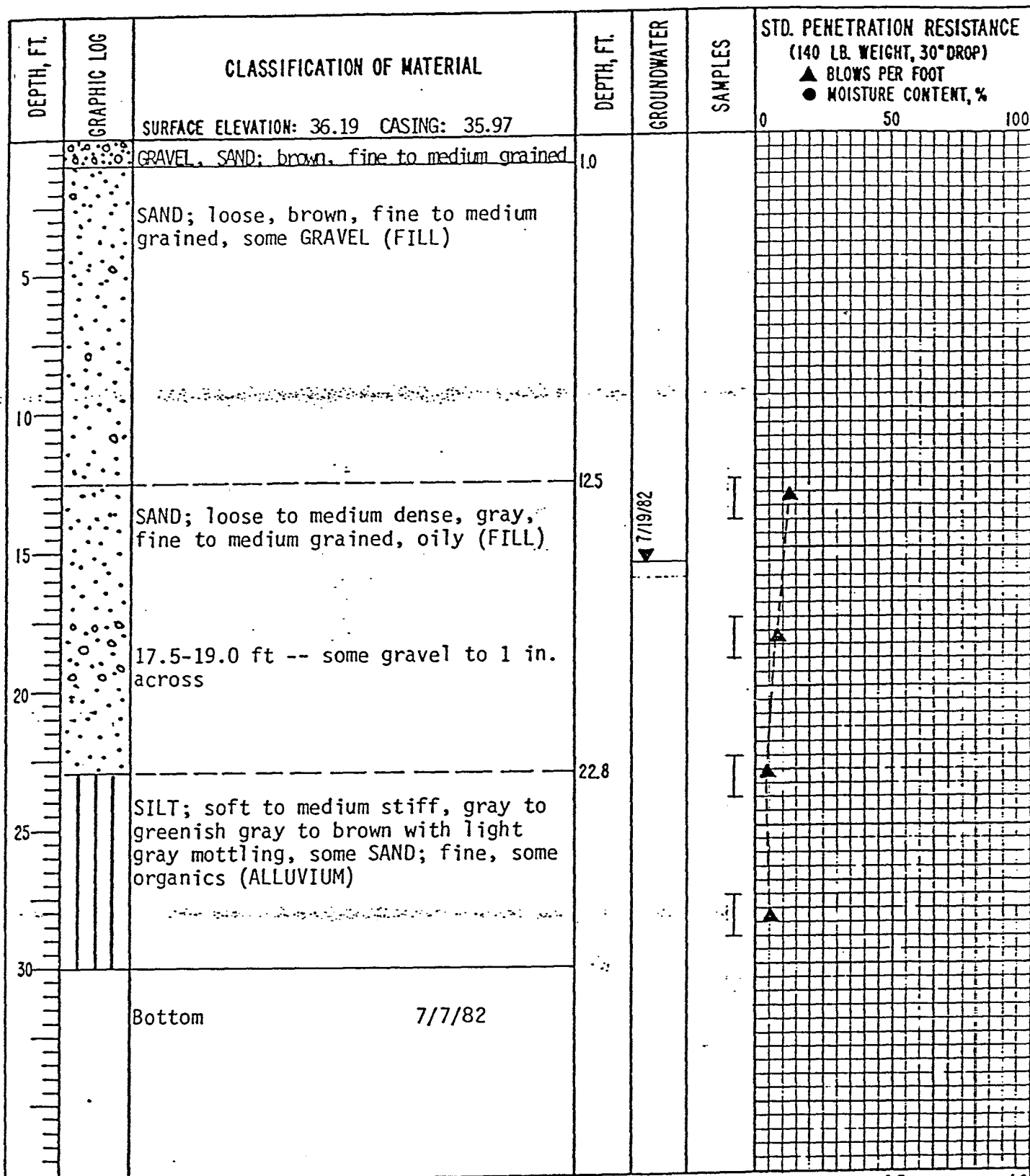
- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ▲ ATTERBERG LIMITS
- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT
- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ.FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



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**BORING LOG B-28**

DATE JULY, 1982 JOB NO. 210-1-2 FIG.



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



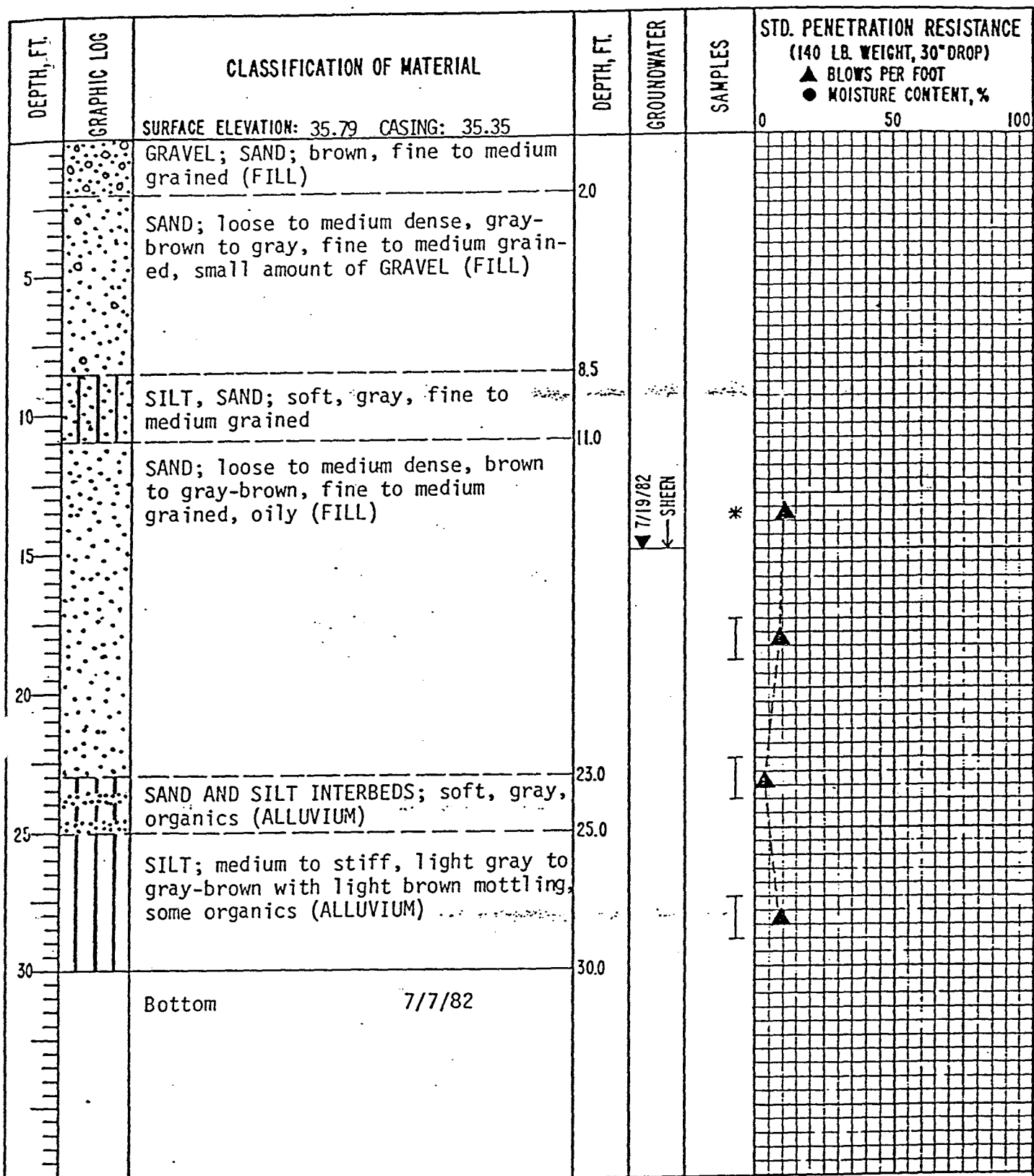
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**BORING LOG B-29**

DATE JULY, 1982

JOB NO. 210-1-2

FIG.



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN

\* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



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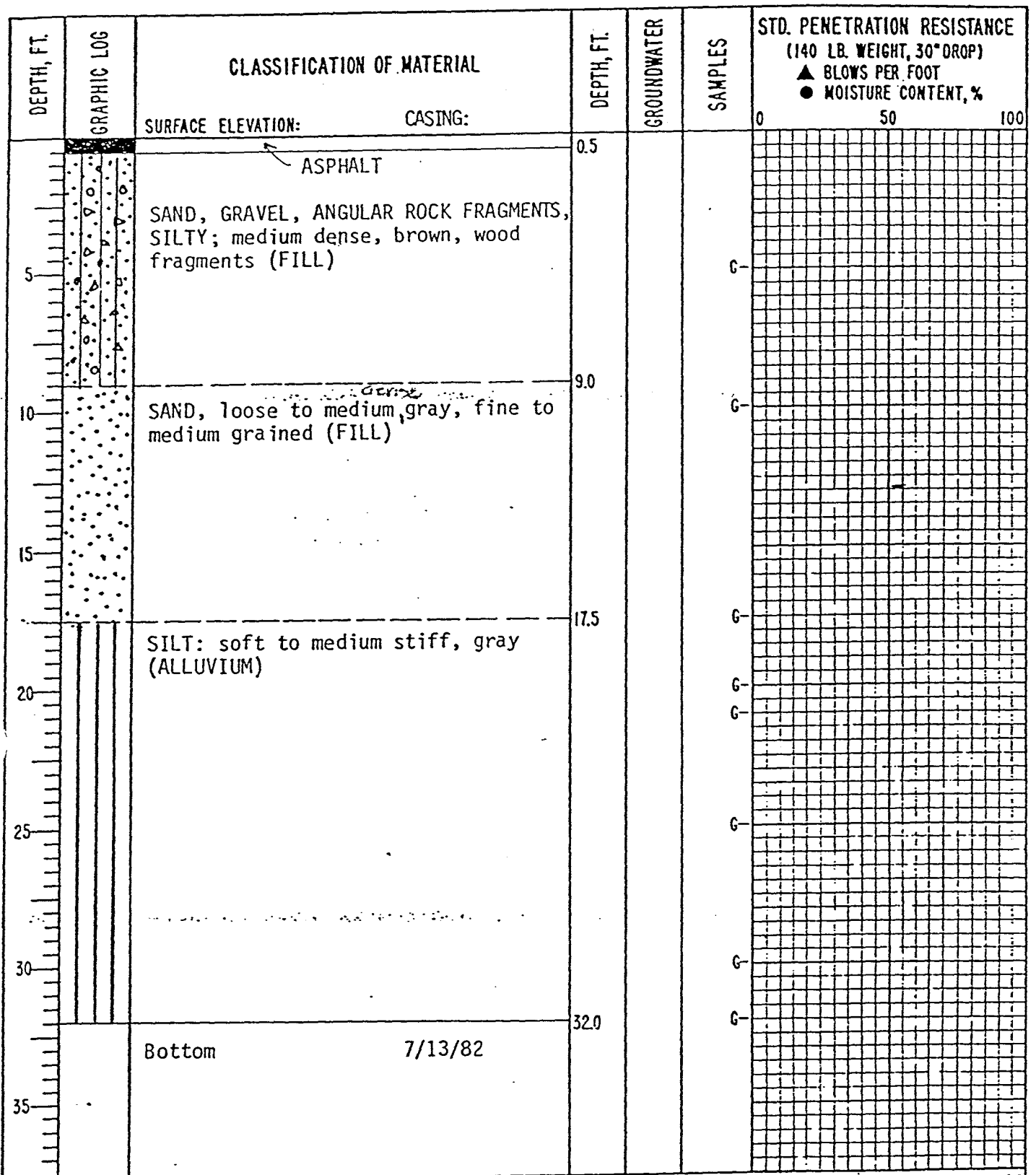
BORING LOG B-30

DATE JULY, 1982

JOB NO. 20-4-2

FIG.

COP002091



#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

#### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)

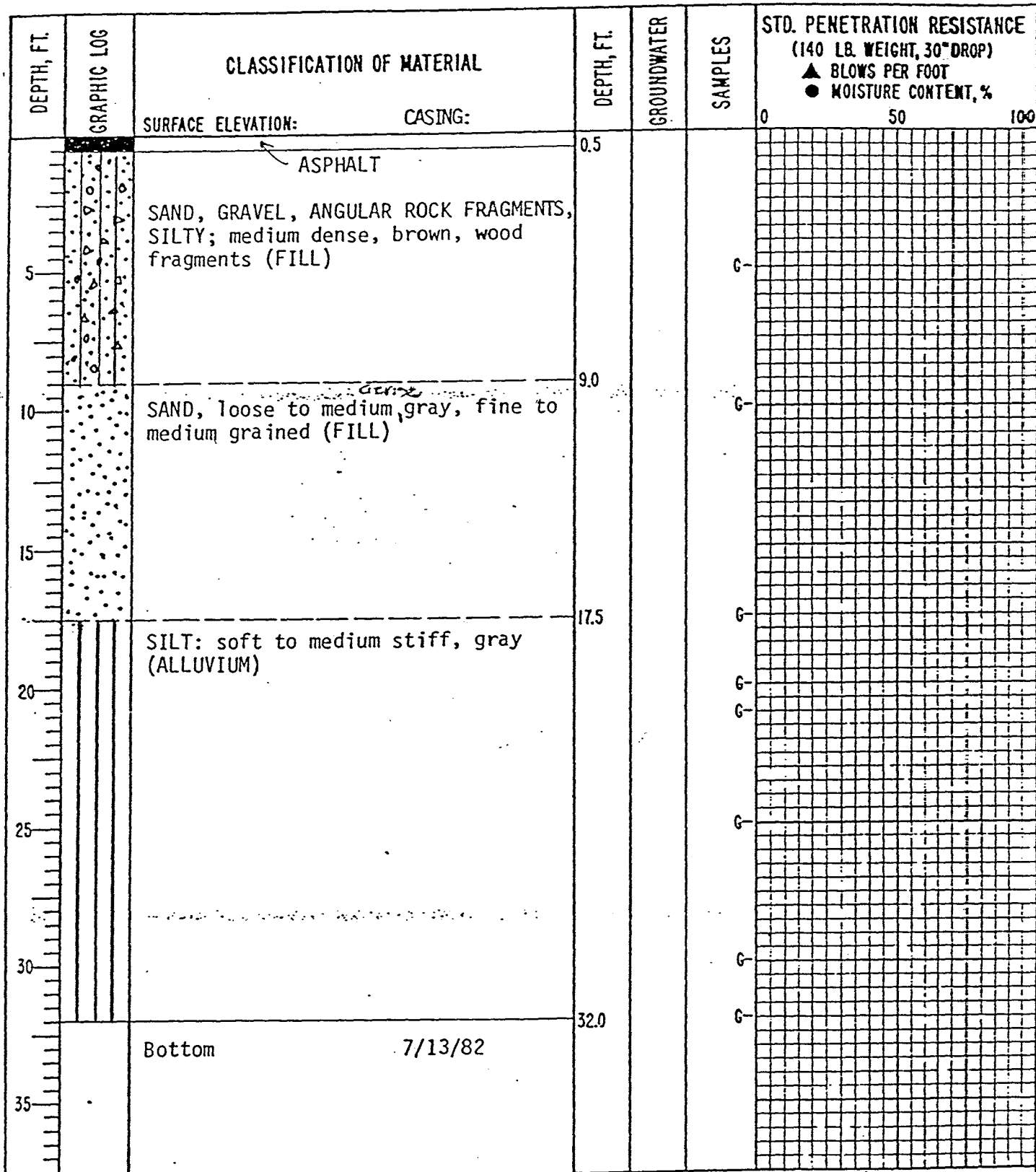


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**BORING LOG B-31**

DATE JULY, 1982 JOB NO. 210-1-2 FIG.

COP002091



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNRAINED SHEAR STRENGTH (TSF)

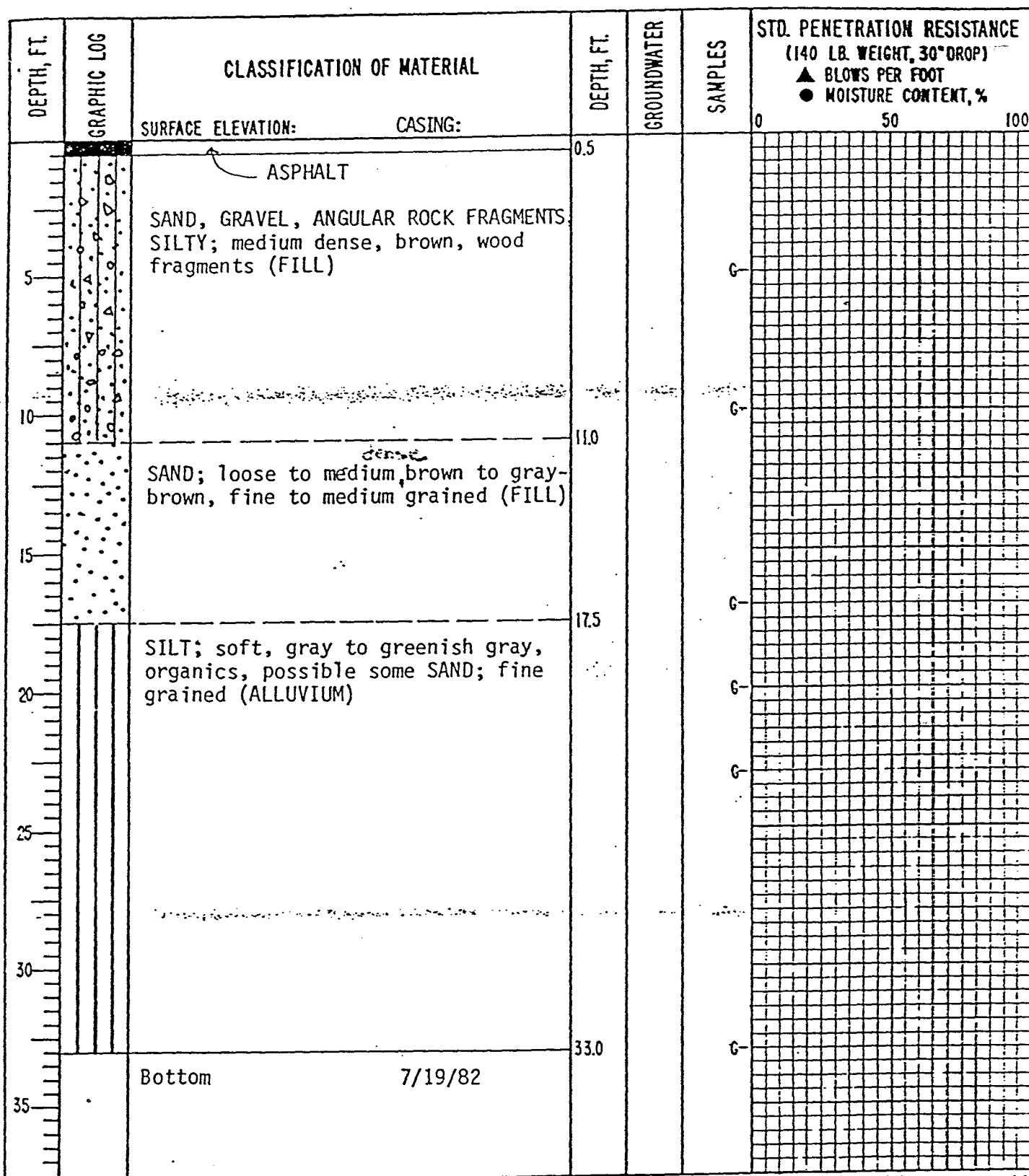


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**BORING LOG B-31**

DATE JULY, 1982 JOB NO. 210-1-2 FIG.





### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH  
TONS/SQ.FT.(TSF)
- UNDRAINED SHEAR  
STRENGTH(TSF)



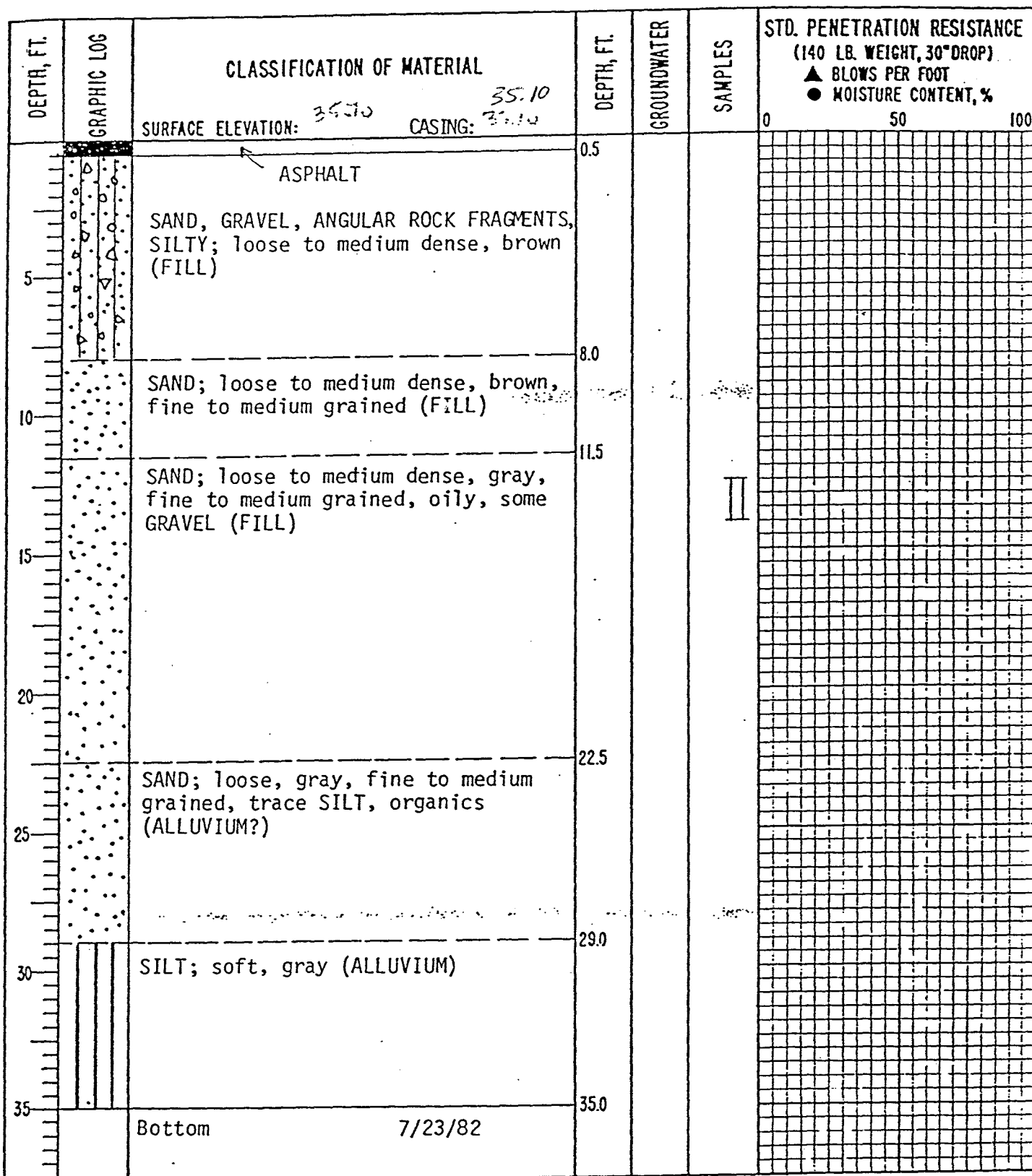
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**BORING LOG B-32**

**DATE JULY, 1982**

**JOB NO. 210-1-2**

**FIG.**



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED

### ATTERBERG LIMITS

- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- ▼ WATER LEVEL
- POROUS TIP
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



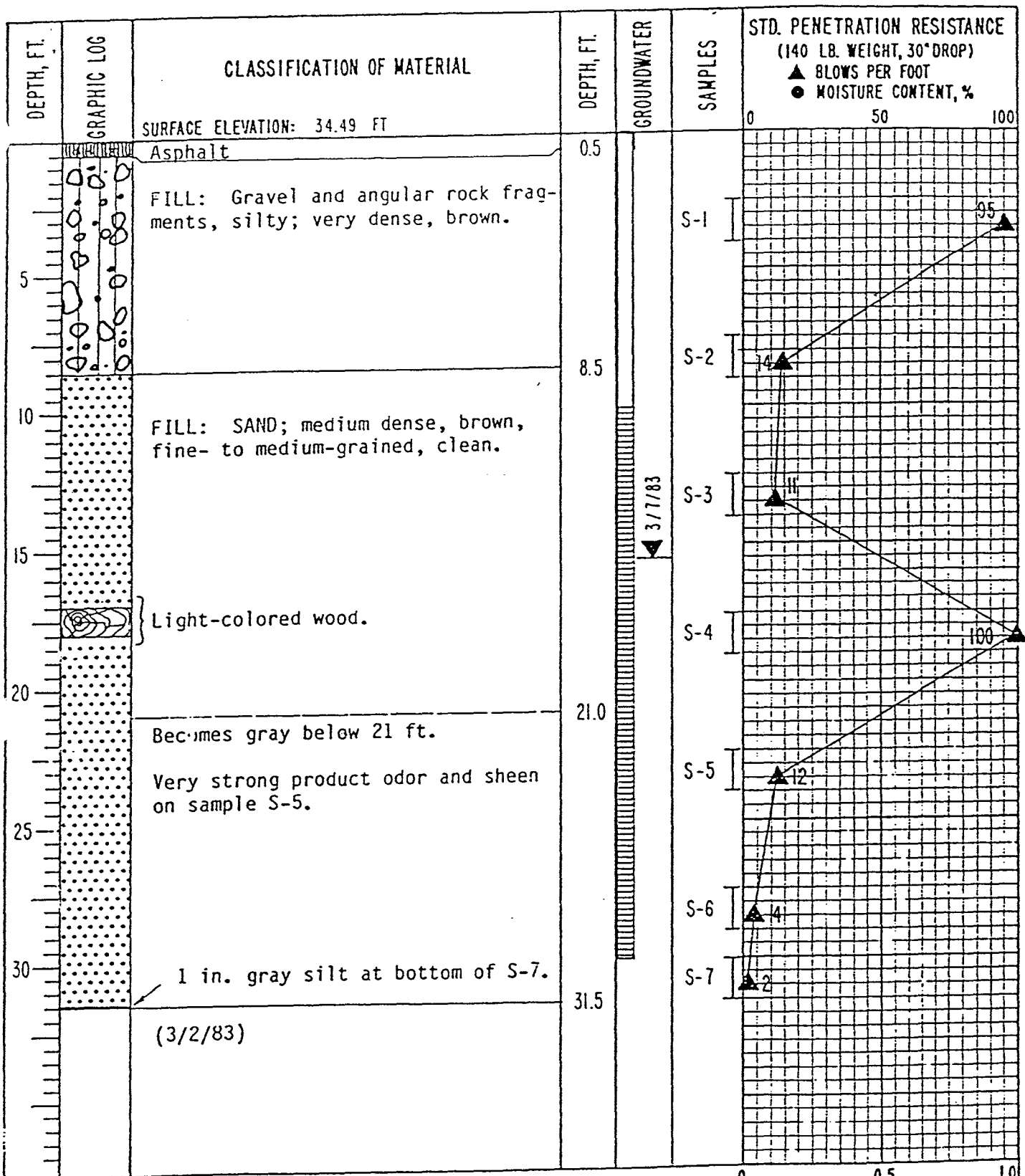
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**BORING LOG B-33**

DATE JULY, 1982

JOB NO. 210-1-2

FIG.



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

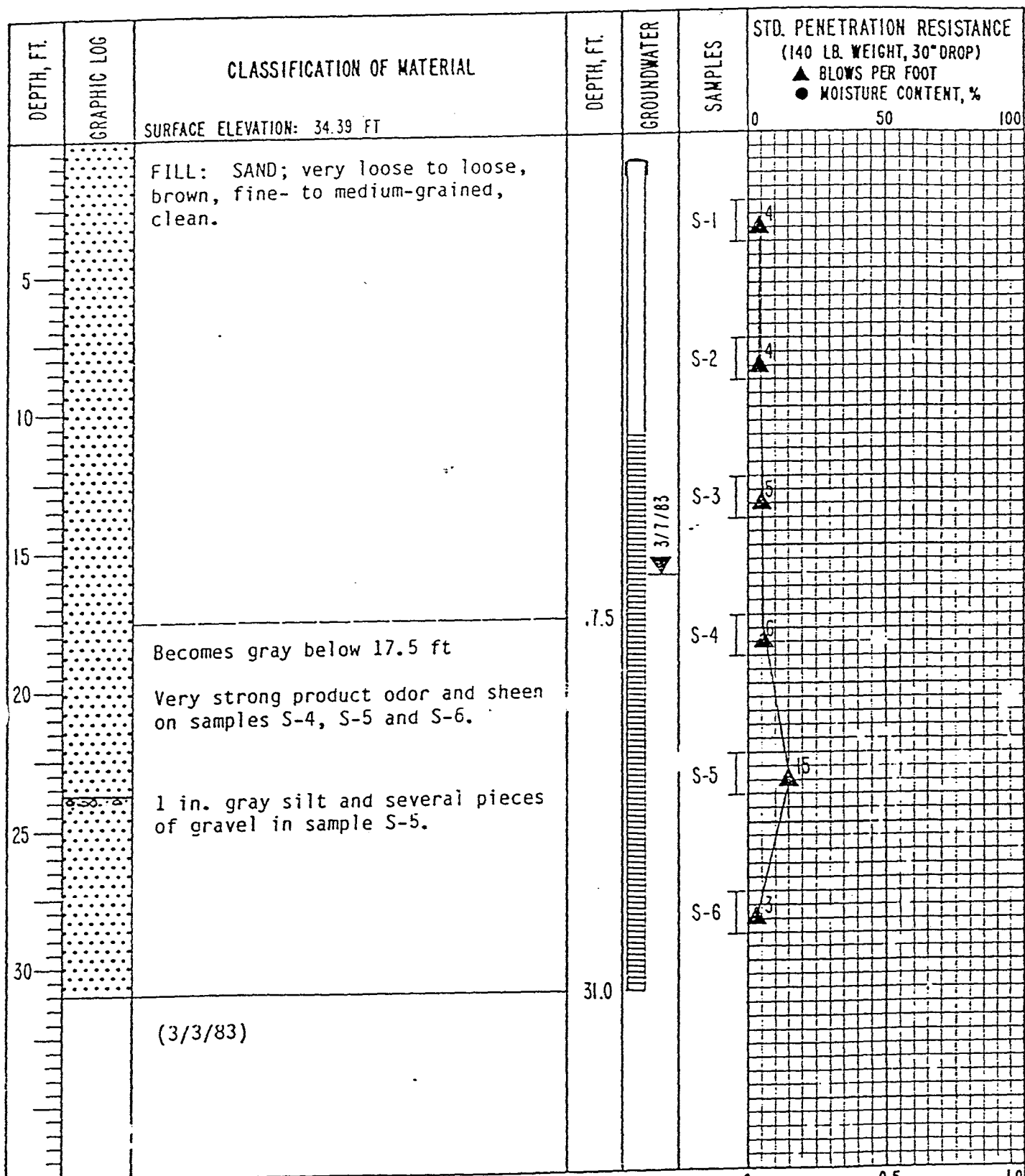
- ▼ WATER LEVEL
- ▨ SLOTTED CASING
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



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**BORING LOG B-34**

DATE MARCH, 1983 JOB NO. 239-1 FIG. 4



#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT
- WATER LEVEL
- SLOTTED CASING
- TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



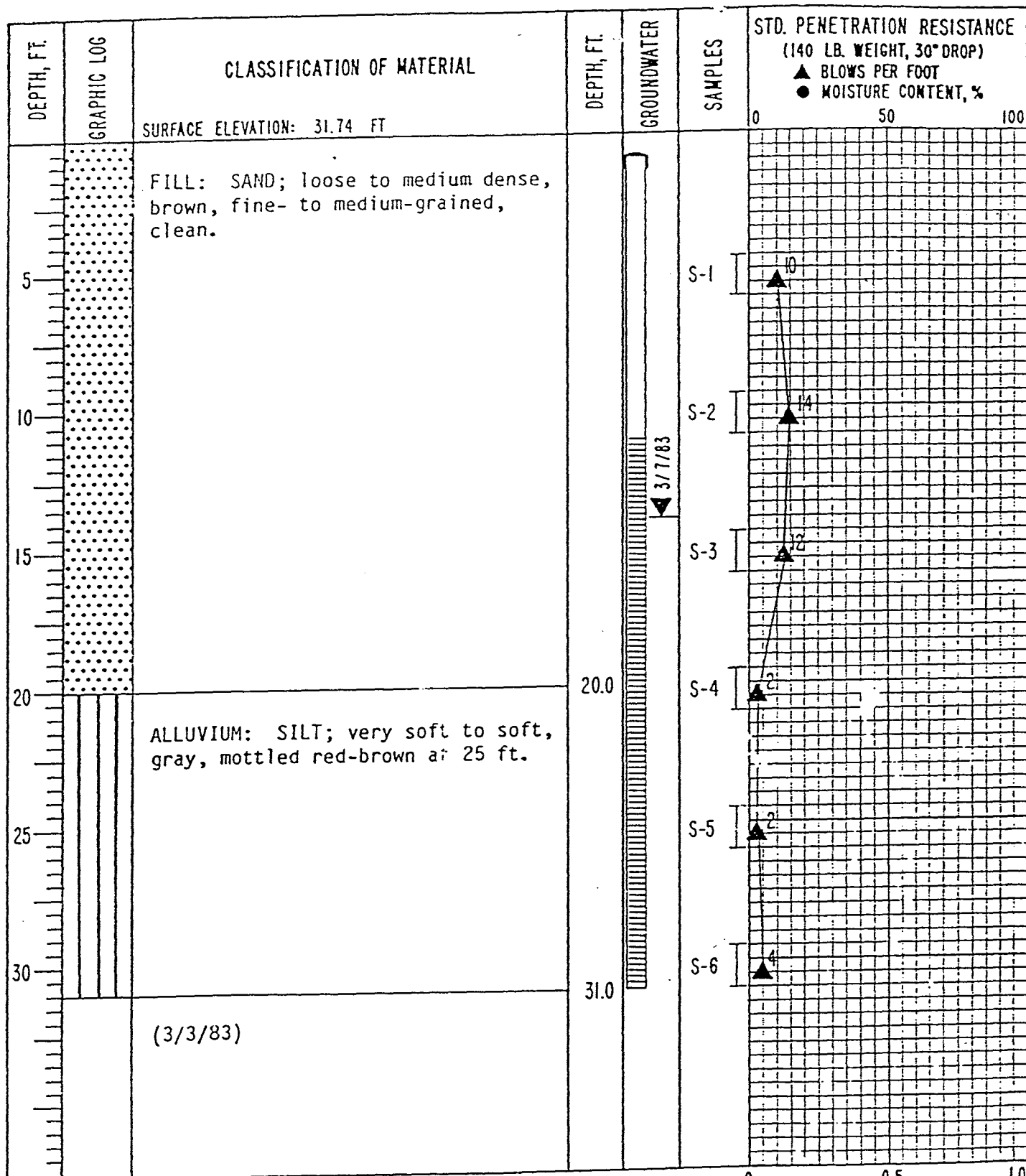
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**BORING LOG B-35**

DATE MARCH 1983 JOB NO. 239.1

FIG. 5

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**LEGEND**

I 2.0" O.D. SPLIT SPOON SAMPLE  
 II 3.0" O.D. THIN WALLED SAMPLE  
 G GRAB SAMPLE OF DRILL CUTTINGS  
 NX CORE RUN  
 \* SAMPLE NOT RECOVERED  
 ATTERBERG LIMITS  
 ○ LIQUID LIMIT  
 — NATURAL WATER CONTENT  
 — PLASTIC LIMIT

WATER LEVEL  
 SLOTTED CASING  
 TORVANE STRENGTH  
 TONS/SQ. FT. (TSF)  
 UNDRAINED SHEAR  
 STRENGTH (TSF)



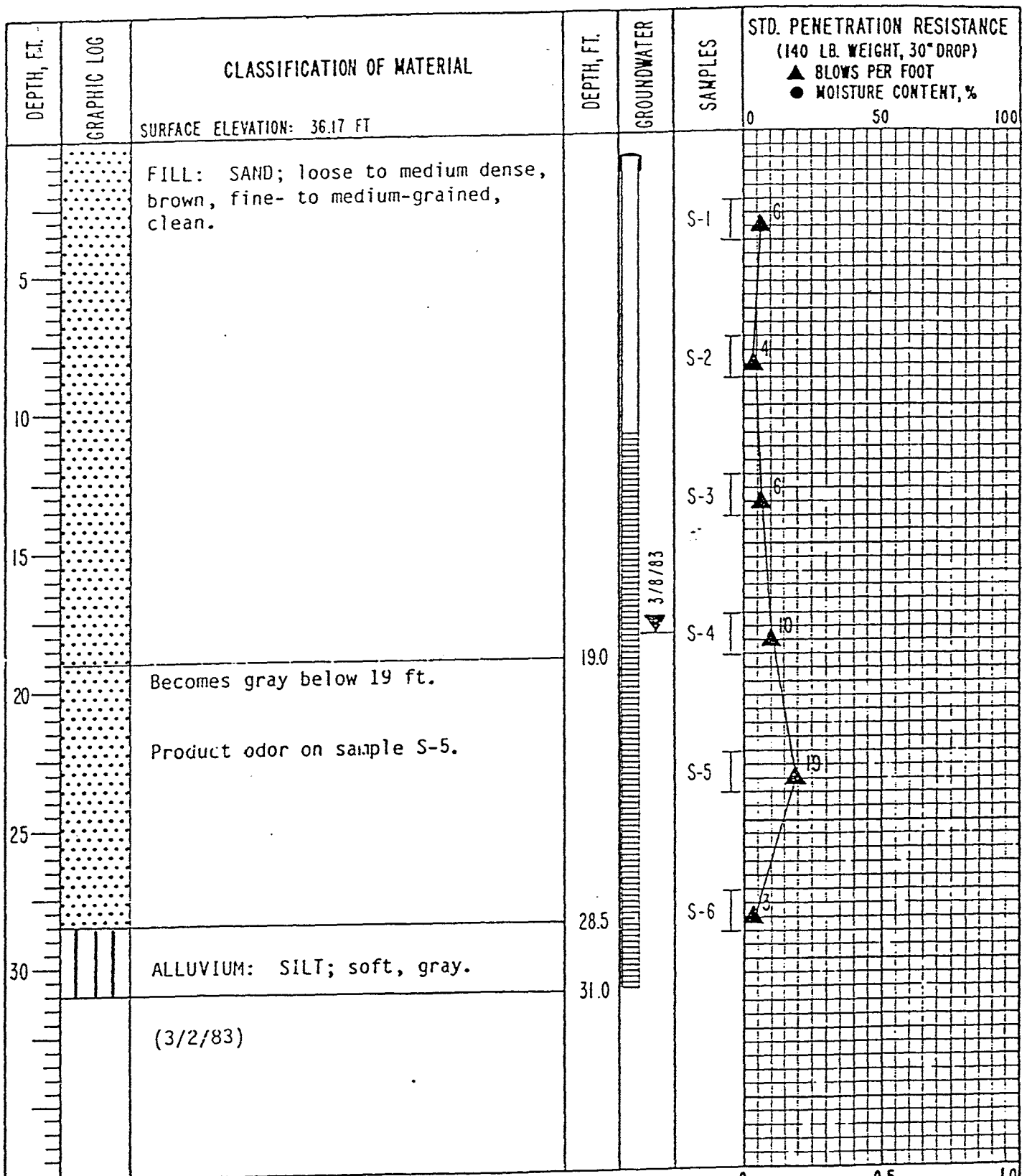
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BORING LOG B-36

DATE MARCH 1983 JOB NO. 239-1

FIG. 6

COP002091



#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
  - LIQUID LIMIT
  - NATURAL WATER CONTENT
  - PLASTIC LIMIT

- WATER LEVEL
- SLOTTED CASING
- TORVANE STRENGTH TONS/SQ.FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



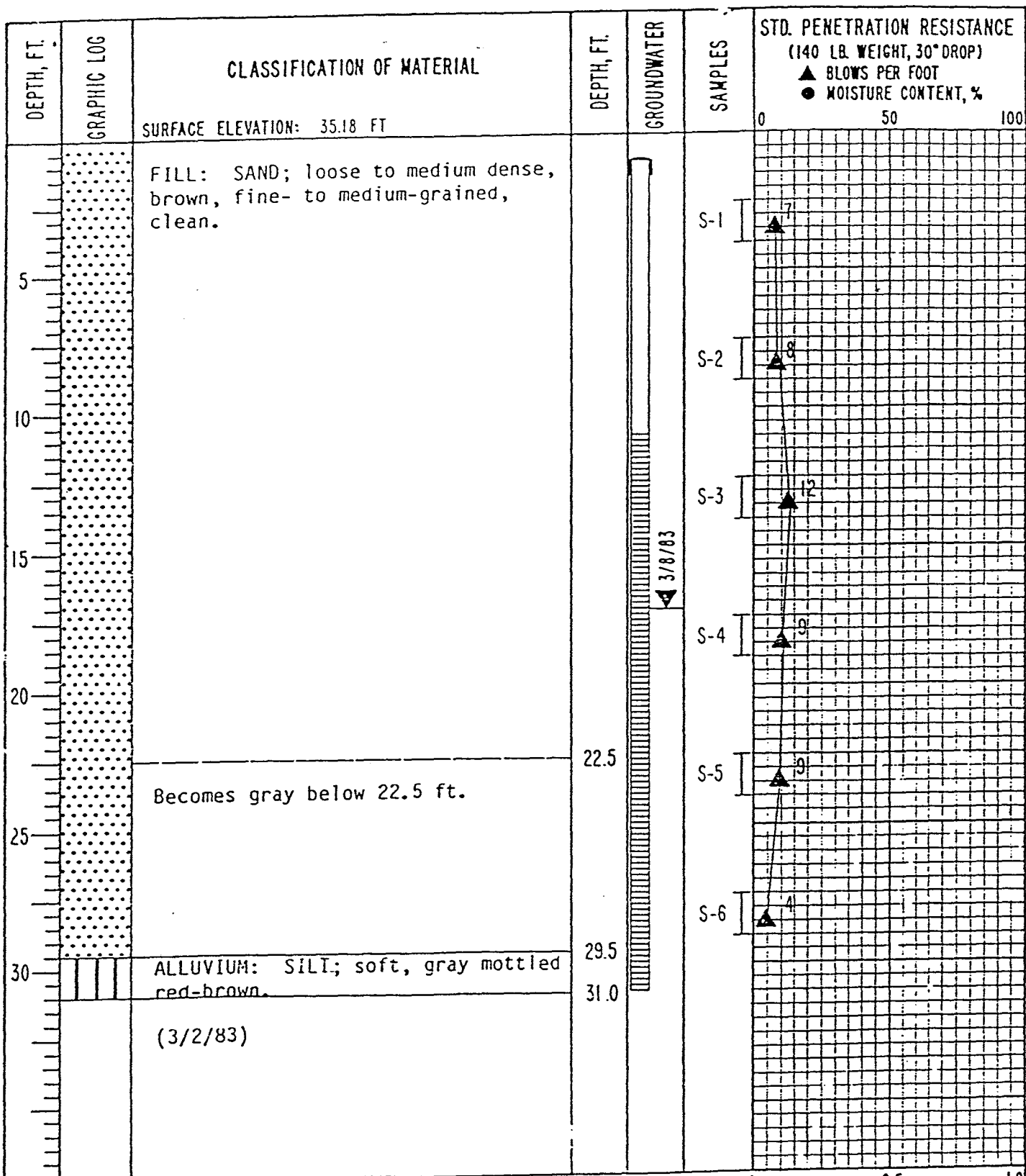
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BORING LOG B-37

DATE MARCH, 1983 JOB NO. 239-1

FIG. 7

COP0020920



#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
  - LIQUID LIMIT
  - NATURAL WATER CONTENT
  - PLASTIC LIMIT

- WATER LEVEL
- SLOTTED CASING
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



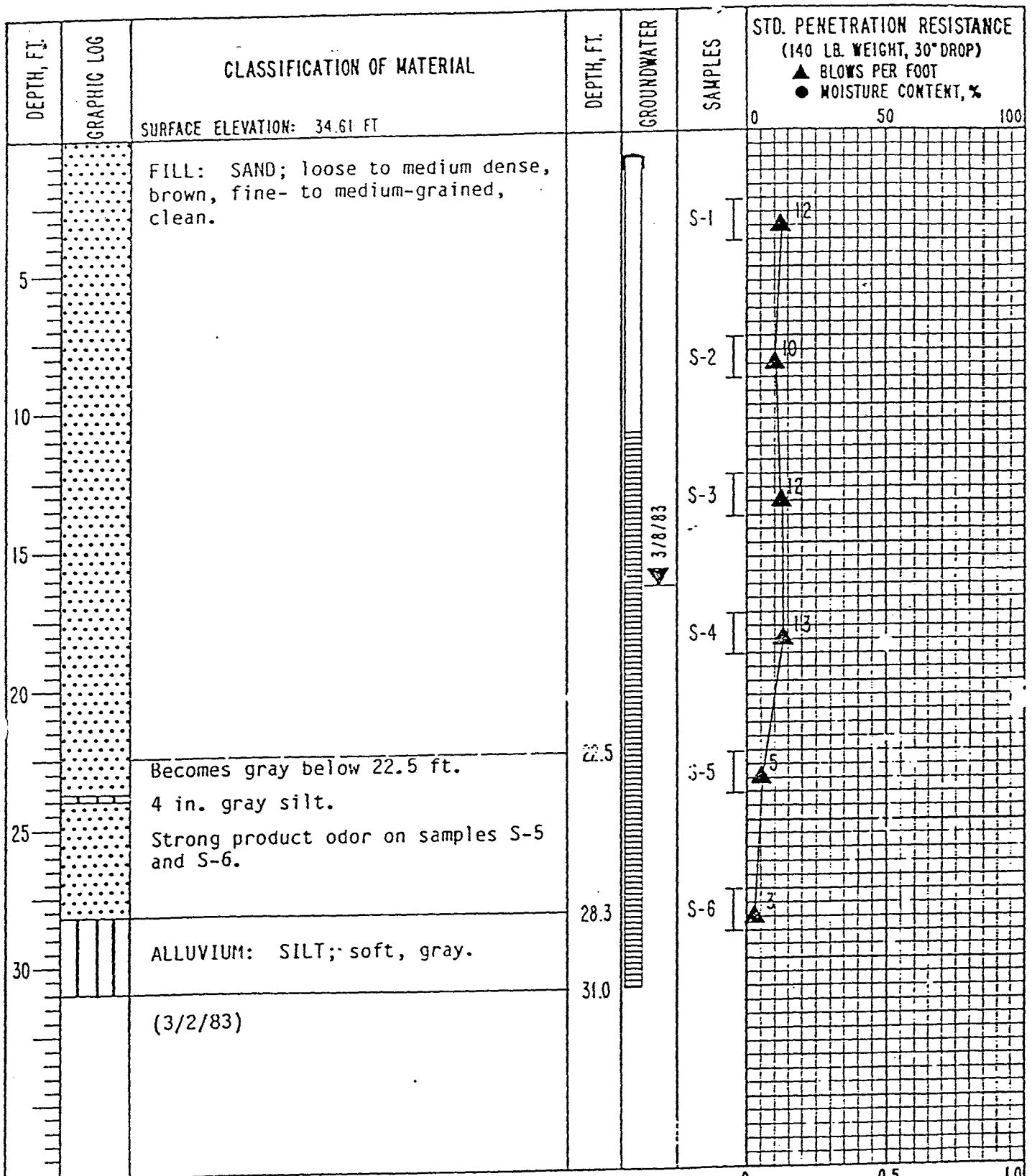
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BORING LOG B-38

DATE MARCH, 1983 JOB NO. 239-1

FIG. 8

COP0020921



#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
  - LIQUID LIMIT
  - NATURAL WATER CONTENT
  - PLASTIC LIMIT

- WATER LEVEL
- SLOTTED CASING
- ◆ TORVAHE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



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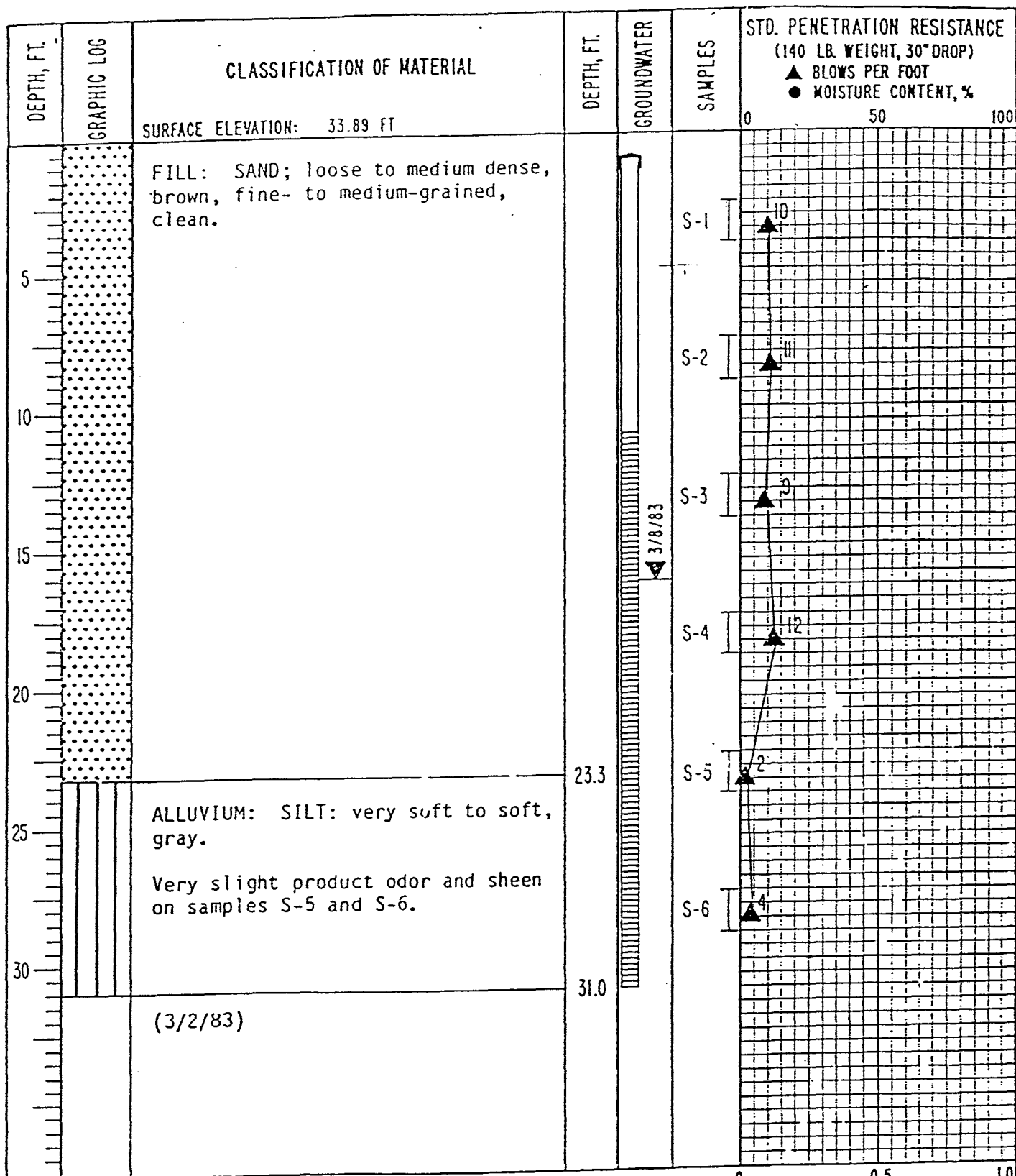
BORING LOG B-39

DATE MARCH, 1983 JOB NO. 239-1

FIG. 9

COP002092





#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- WATER LEVEL
- SLOTTED CASING
- TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)

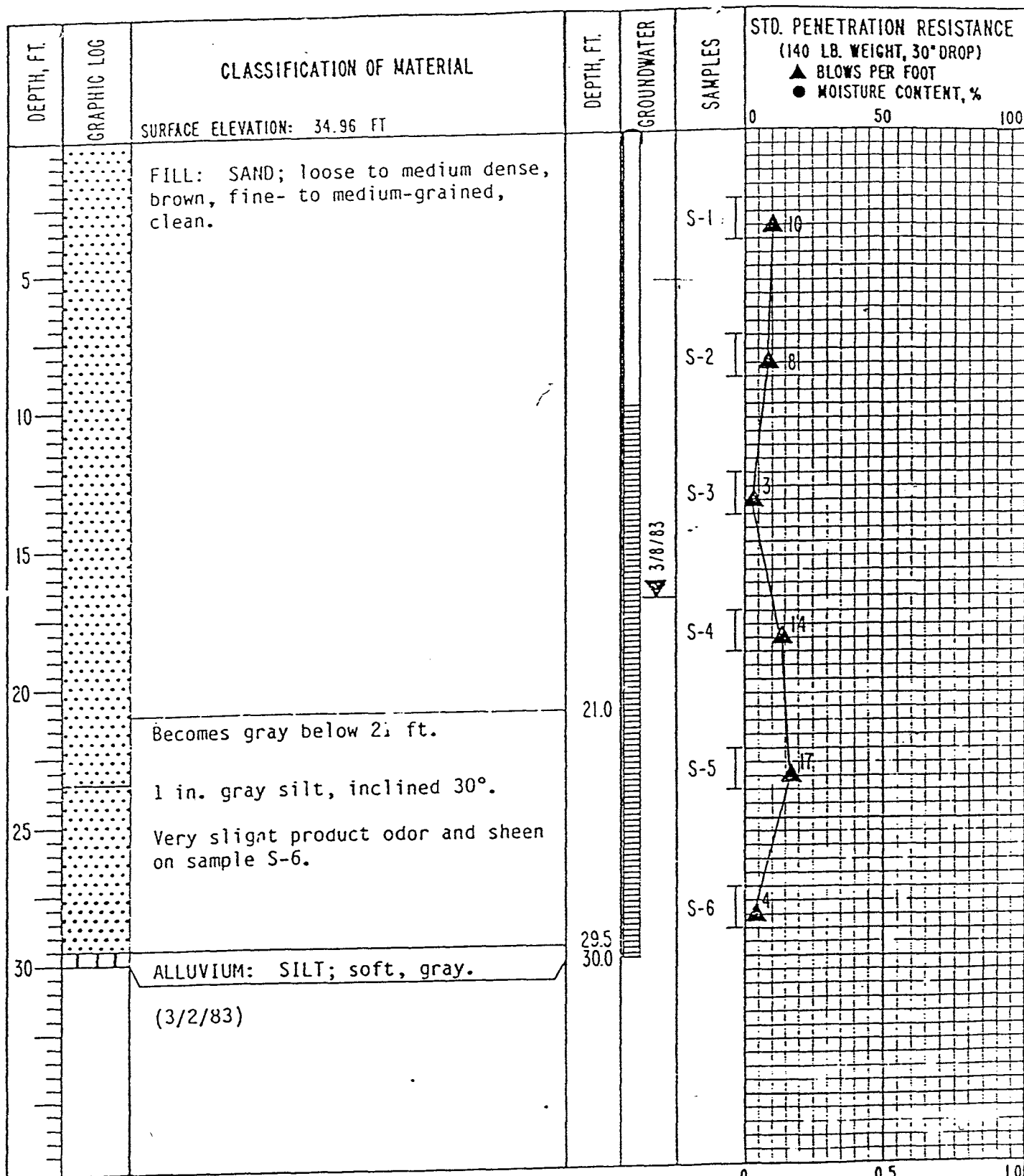


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BORING LOG B-40



DATE MARCH, 1983 JOB NO. 239-1 FIG. 10

COP0020923



#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- MX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
  - LIQUID LIMIT
  - NATURAL WATER CONTENT
  - PLASTIC LIMIT

-  WATER LEVEL
-  SLOTTED CASING
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)

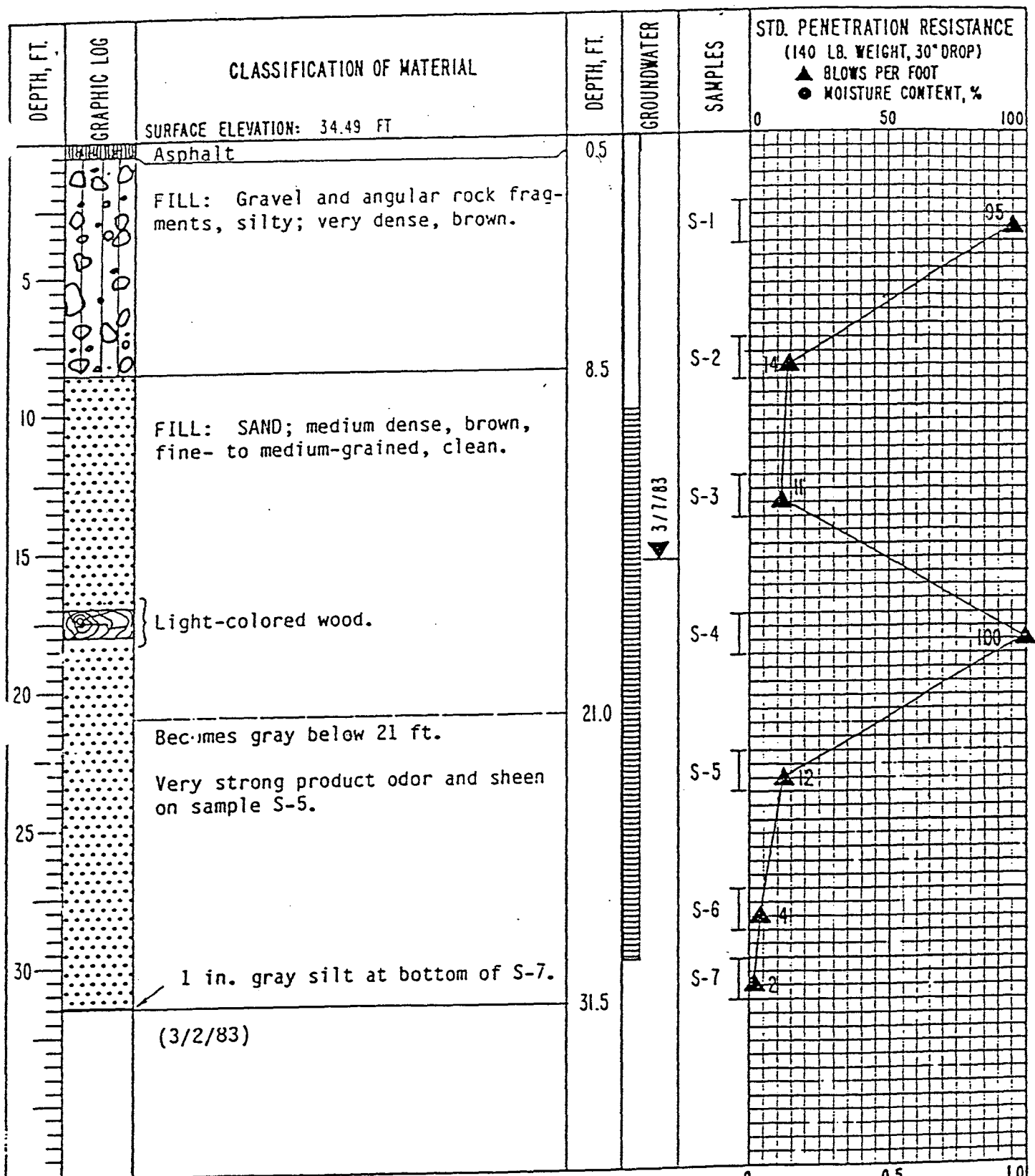


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BORING LOG B-41

DATE MARCH, 1983 JOB NO. 239-1 FIG. 11

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#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
  - LIQUID LIMIT
  - NATURAL WATER CONTENT
  - PLASTIC LIMIT

- ▼ WATER LEVEL
- ▨ SLOTTED CASING
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)



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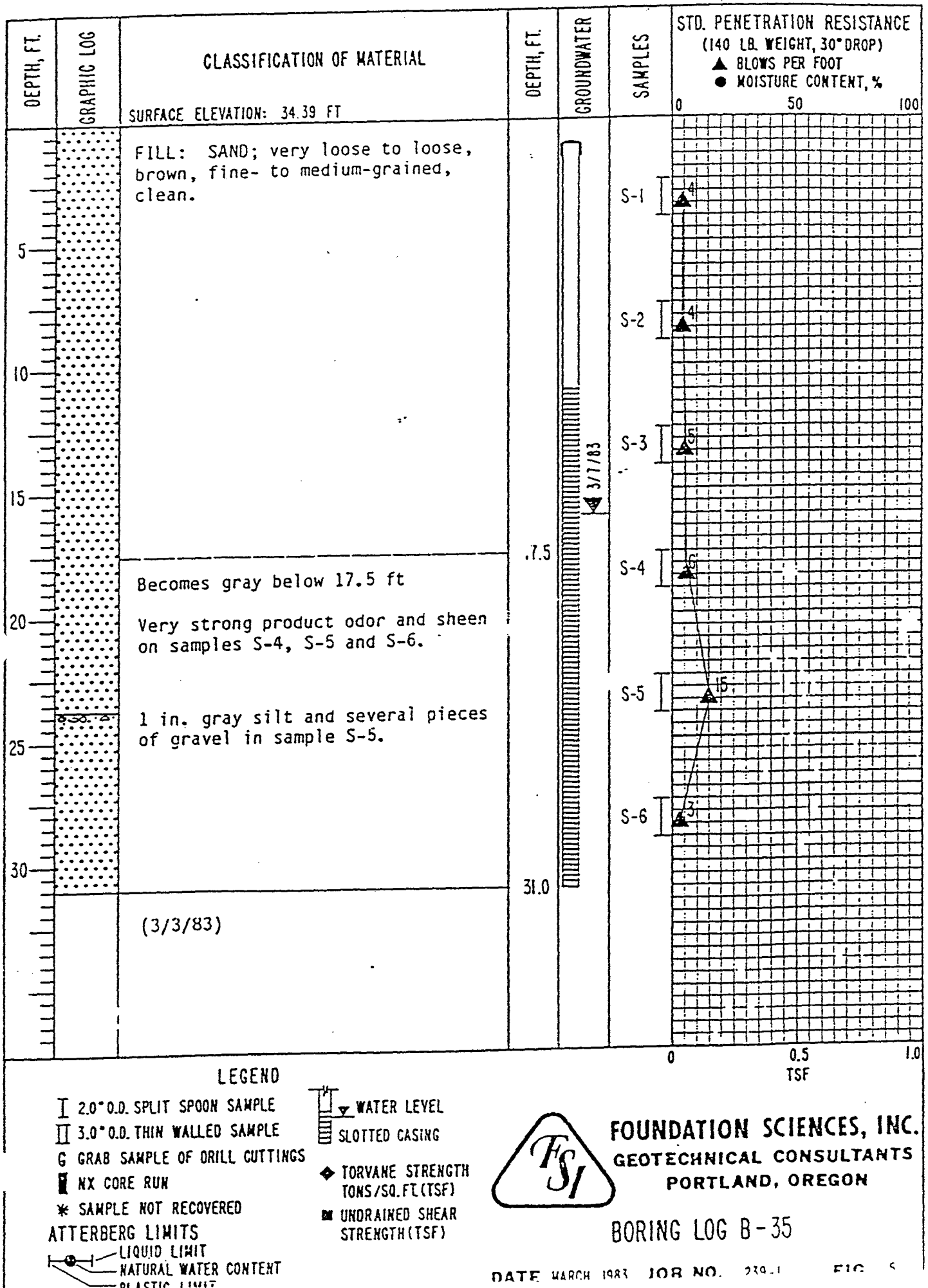
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DATE MARCH, 1983 JOB NO.

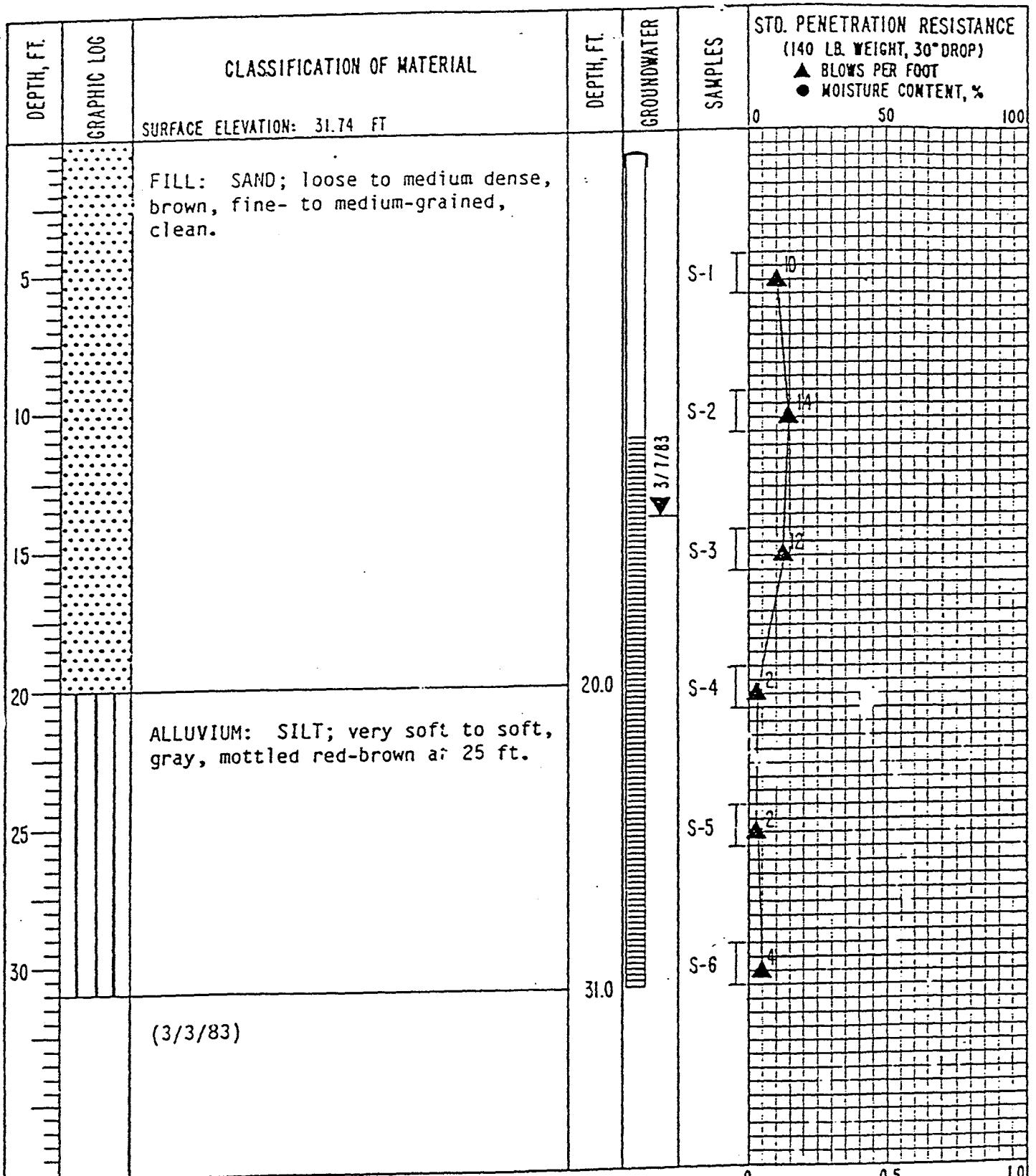
239-1

FIG. 4

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#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- WATER LEVEL
- SLOTTED CASING
- ◆ TORVANE STRENGTH  
TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR  
STRENGTH (TSF)



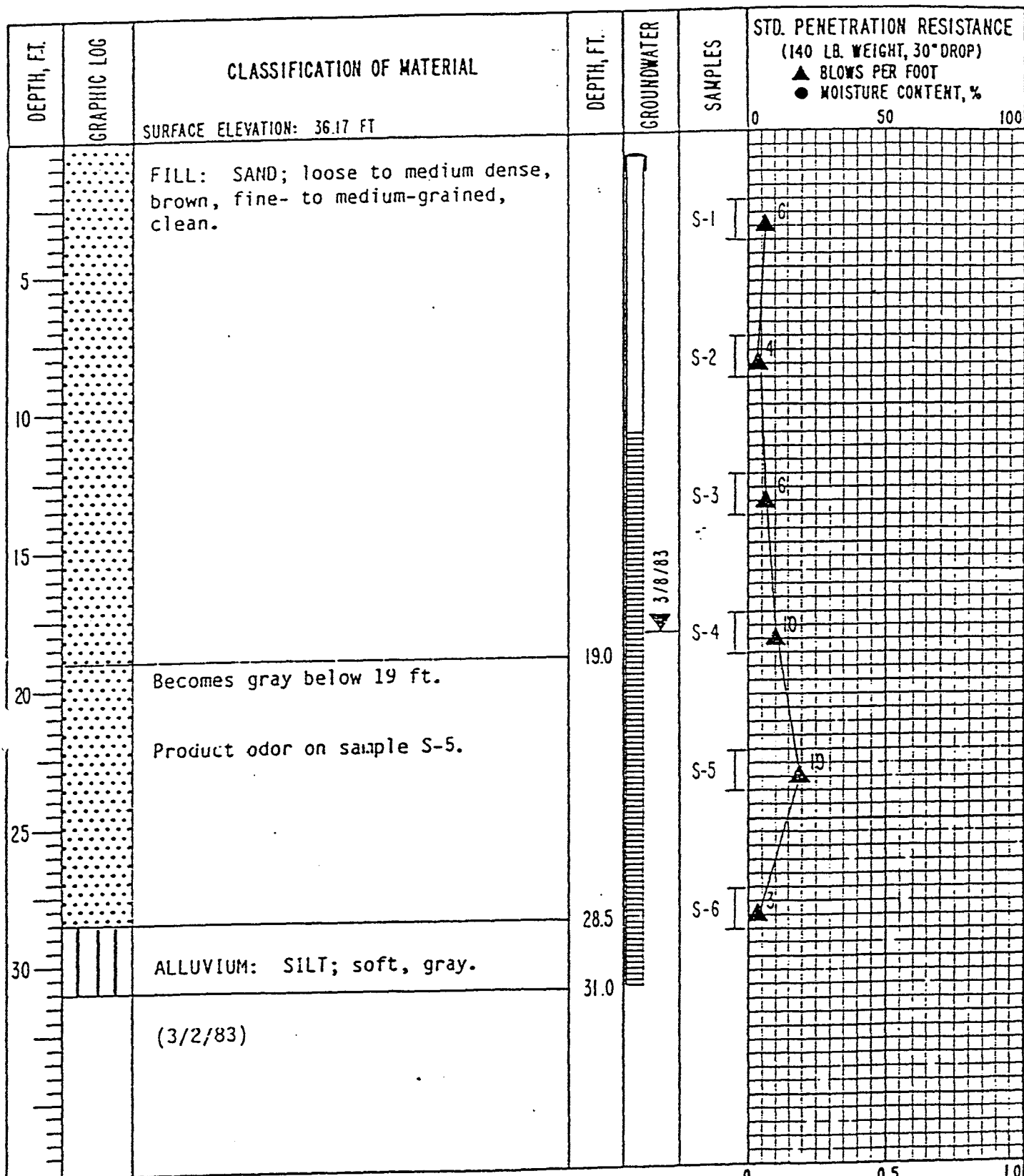
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PORTLAND, OREGON

BORING LOG B-36

DATE MARCH 1983 JOB NO. 239-1

FIG. 6

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#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
  - LIQUID LIMIT
  - NATURAL WATER CONTENT
  - PLASTIC LIMIT

- WATER LEVEL
- SLOTTED CASING
- TORVANE STRENGTH  
TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR  
STRENGTH (TSF)



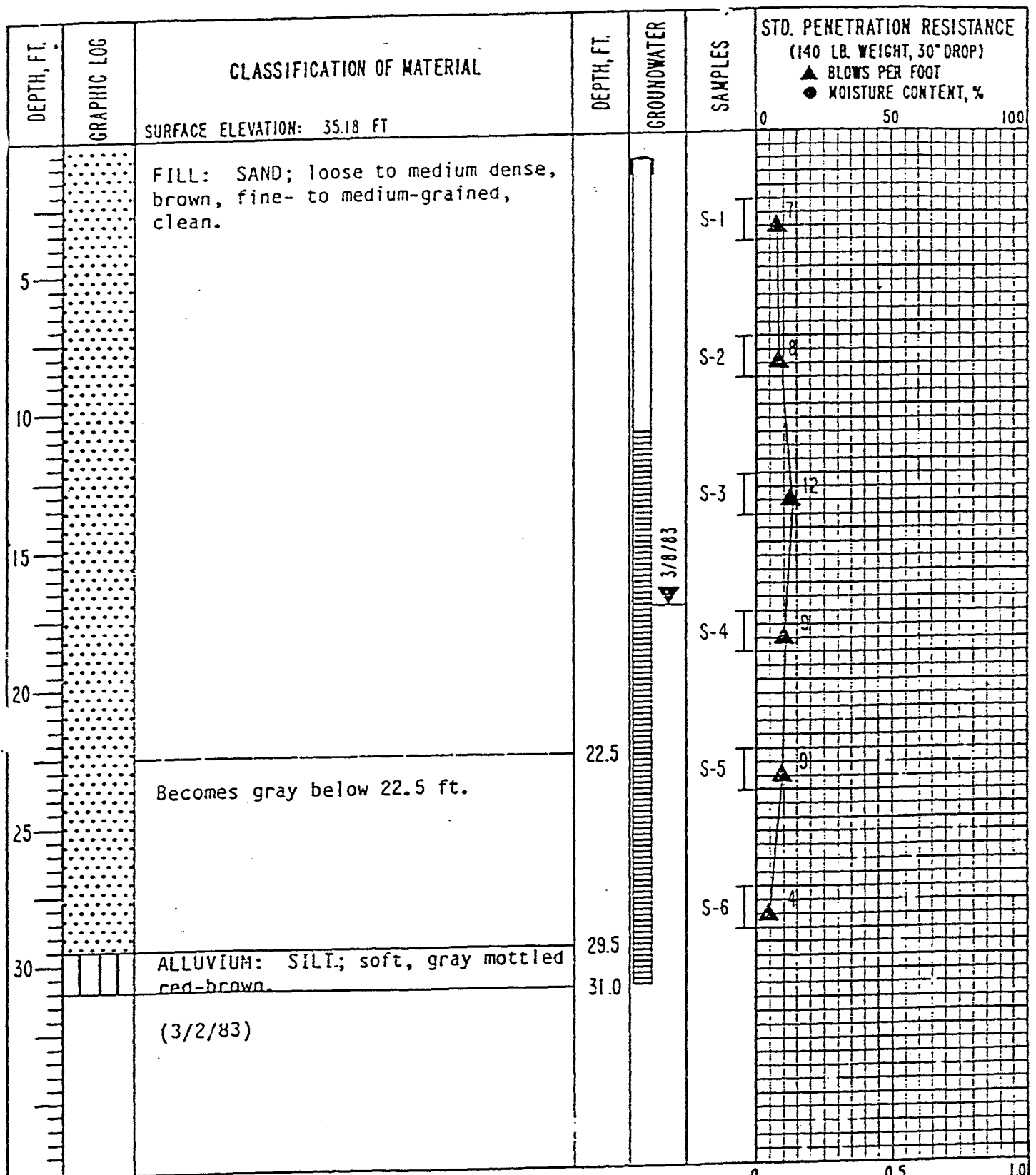
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PORTLAND, OREGON

BORING LOG B-37

DATE MARCH, 1983 JOB NO. 239-1

FIG. 7

COP0020928



#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
  - LIQUID LIMIT
  - NATURAL WATER CONTENT
  - PLASTIC LIMIT

- WATER LEVEL
- SLOTTED CASING
- ◆ TORVANE STRENGTH TONS/SQ.FT.(TSF)
- UNDRAINED SHEAR STRENGTH(TSF)



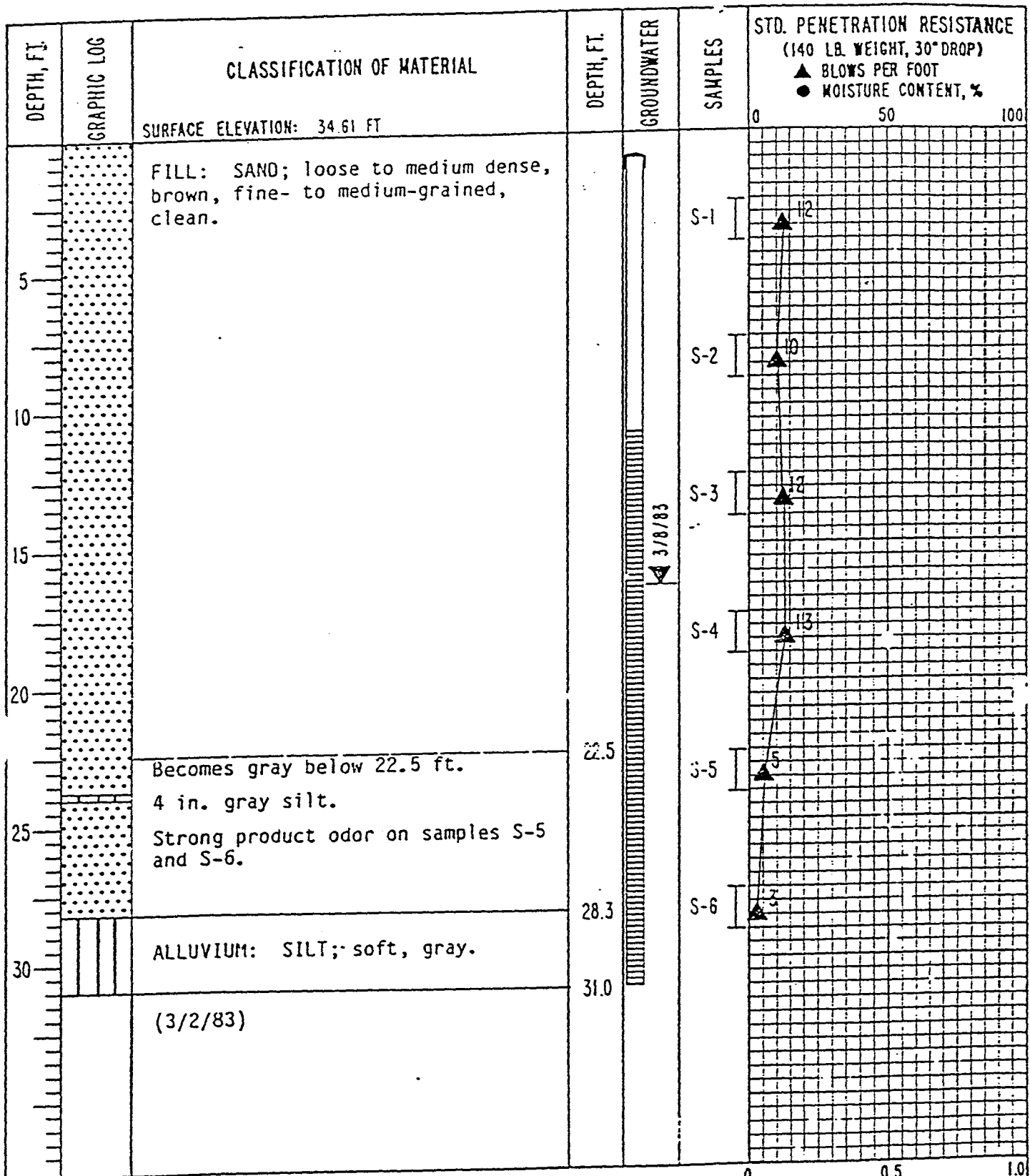
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**PORTLAND, OREGON**

**BORING LOG B-38**

DATE MARCH, 1983 JOB NO. 239-1

FIG. 8

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#### LEGEND

- 2.0" O.D. SPLIT SPOON SAMPLE
- 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
  - LIQUID LIMIT
  - NATURAL WATER CONTENT
  - PLASTIC LIMIT

- WATER LEVEL
- SLOTTED CASING
- TORVANE STRENGTH  
TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR  
STRENGTH (TSF)



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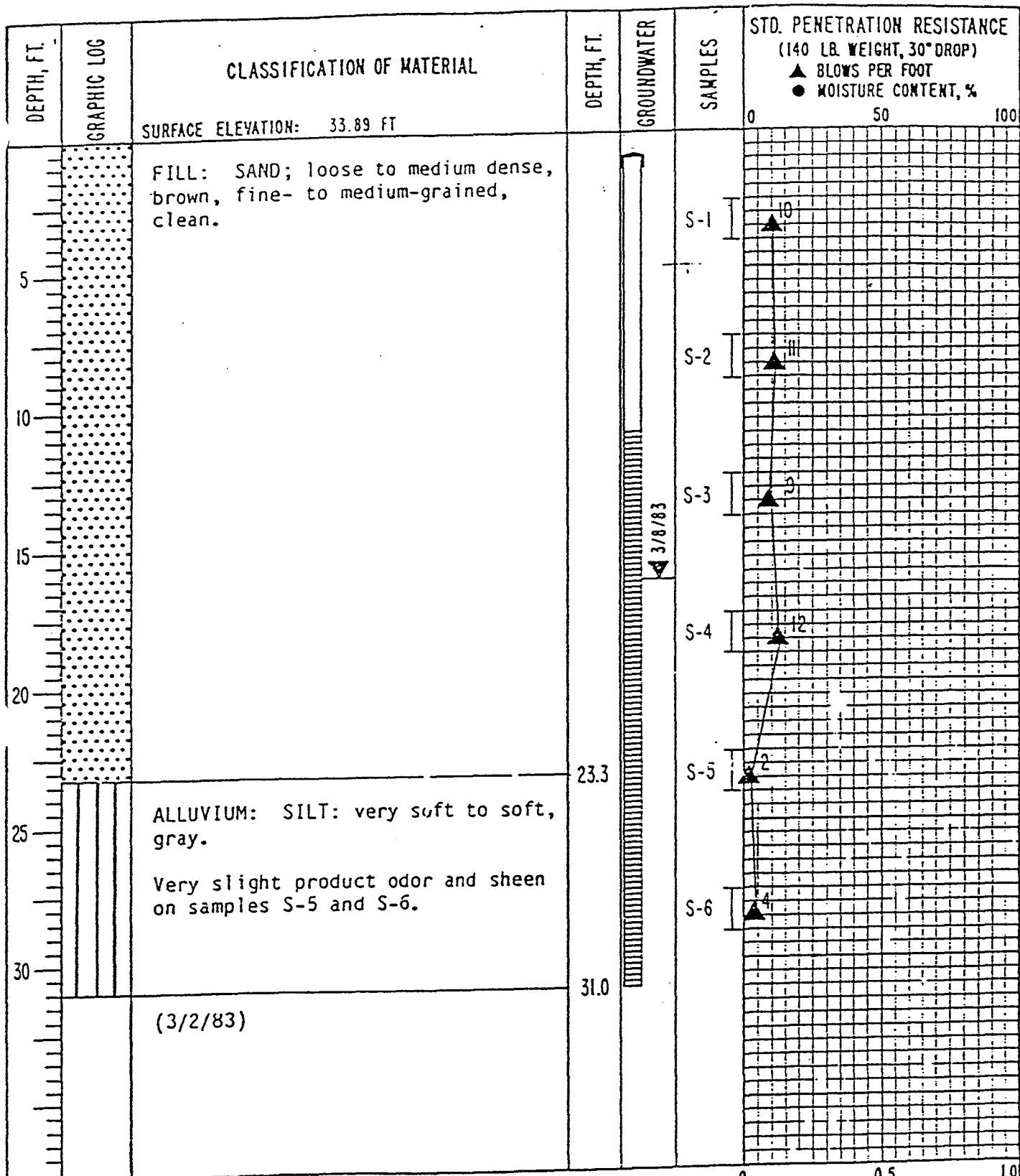
BORING LOG B-39

DATE MARCH, 1983 JOB NO. 239-1

FIG. 9

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#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- WATER LEVEL
- SLOTTED CASING
- ◆ TORVANE STRENGTH  
TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR  
STRENGTH (TSF)

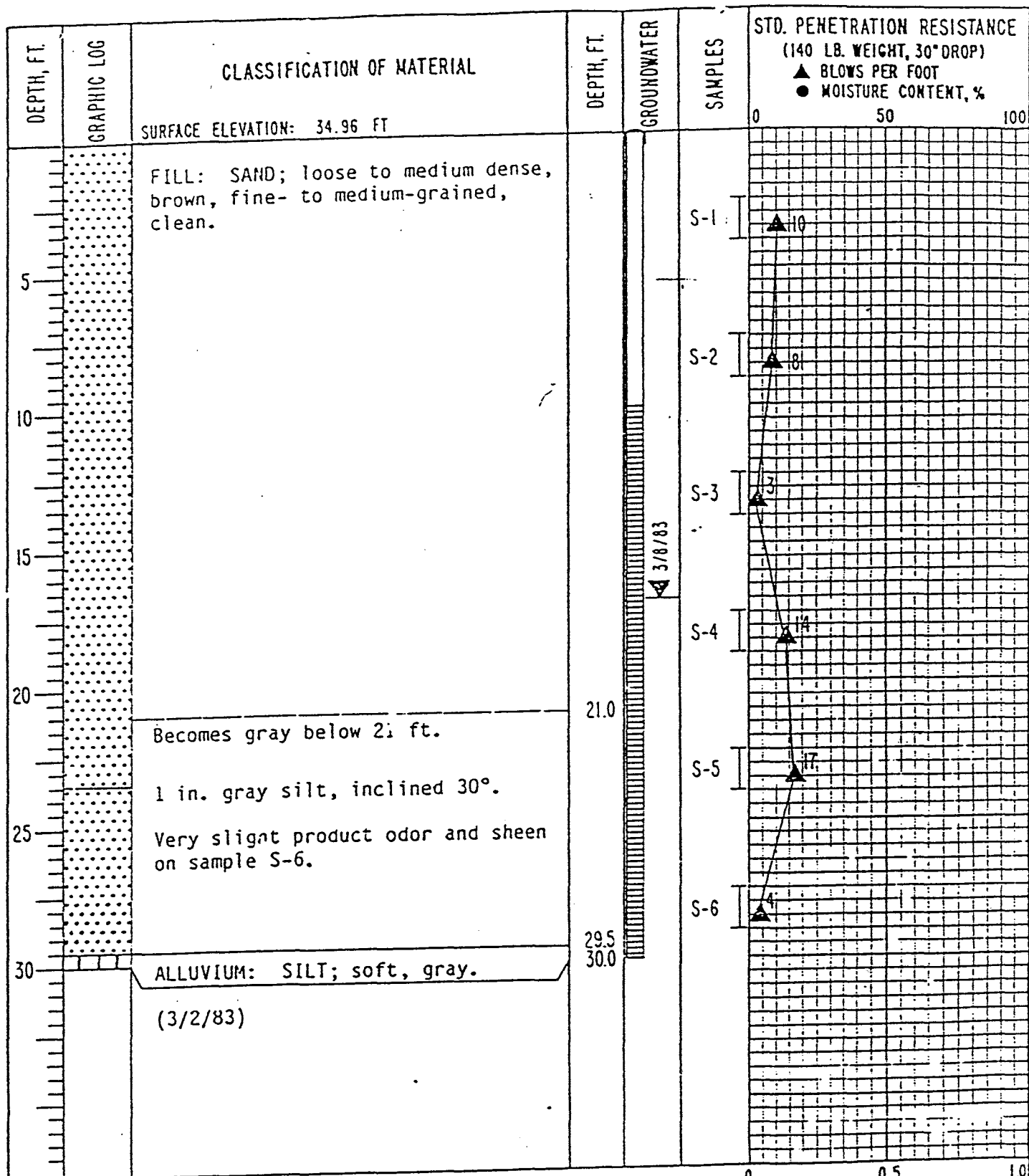


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BORING LOG B-40

DATE MARCH, 1983 JOB NO. 239-1 FIG. 10

COP0020931



#### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- NX CORE RUN
- \* SAMPLE NOT RECOVERED
- ATTERBERG LIMITS
- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

- WATER LEVEL
- SLOTTED CASING
- ◆ TORVANE STRENGTH TONS/SQ. FT. (TSF)
- UNDRAINED SHEAR STRENGTH (TSF)

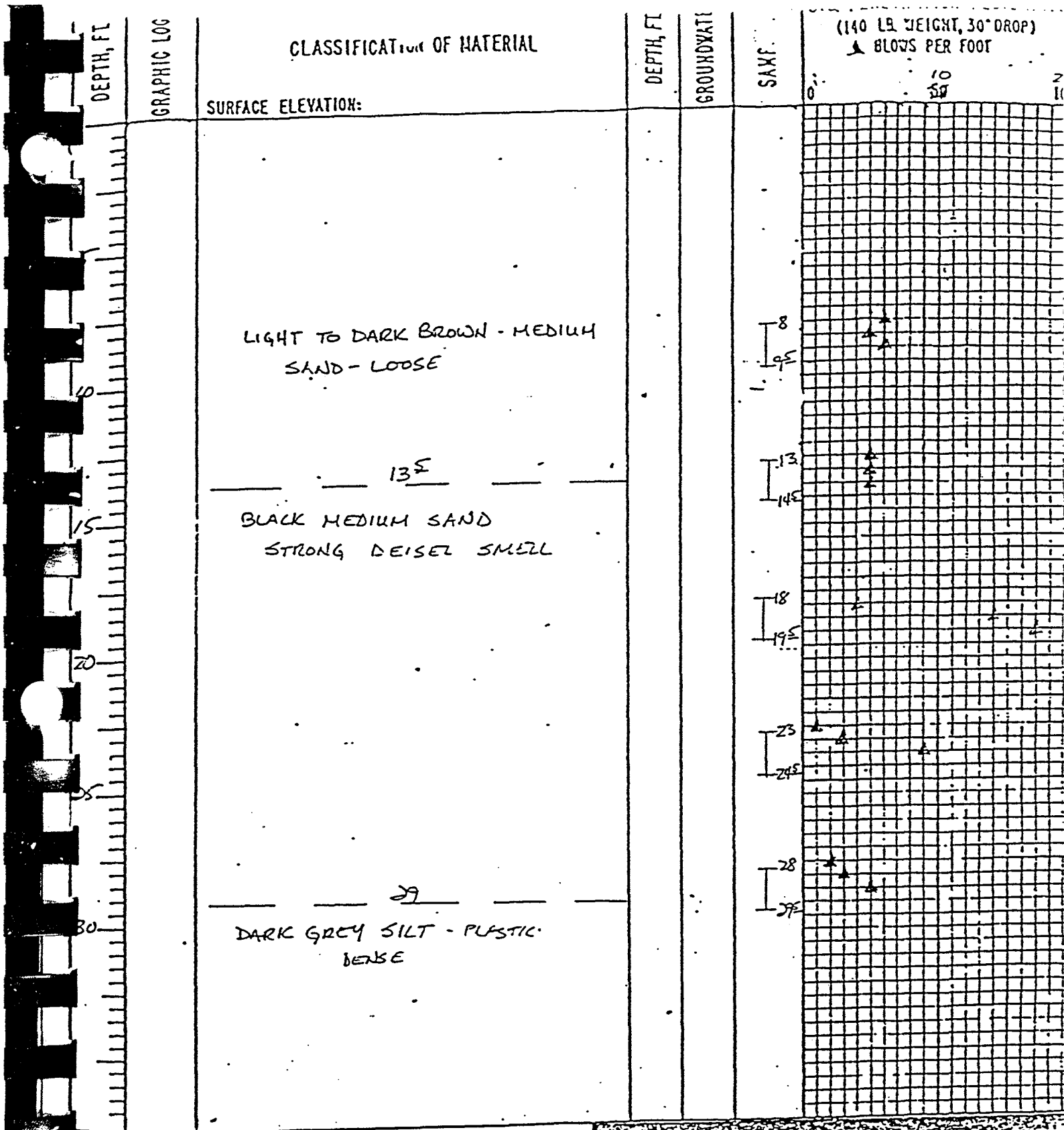


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BORING LOG B-41

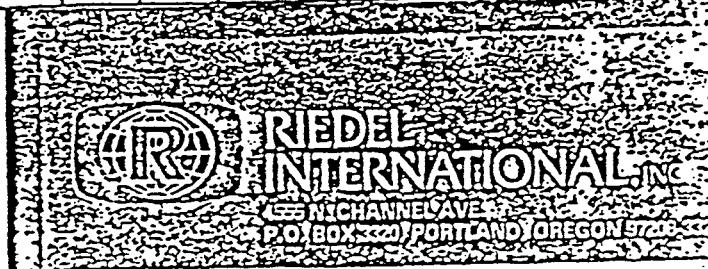
DATE MARCH, 1983 JOB NO. 239-1 FIG. 11

COP0020932



### LEGEND

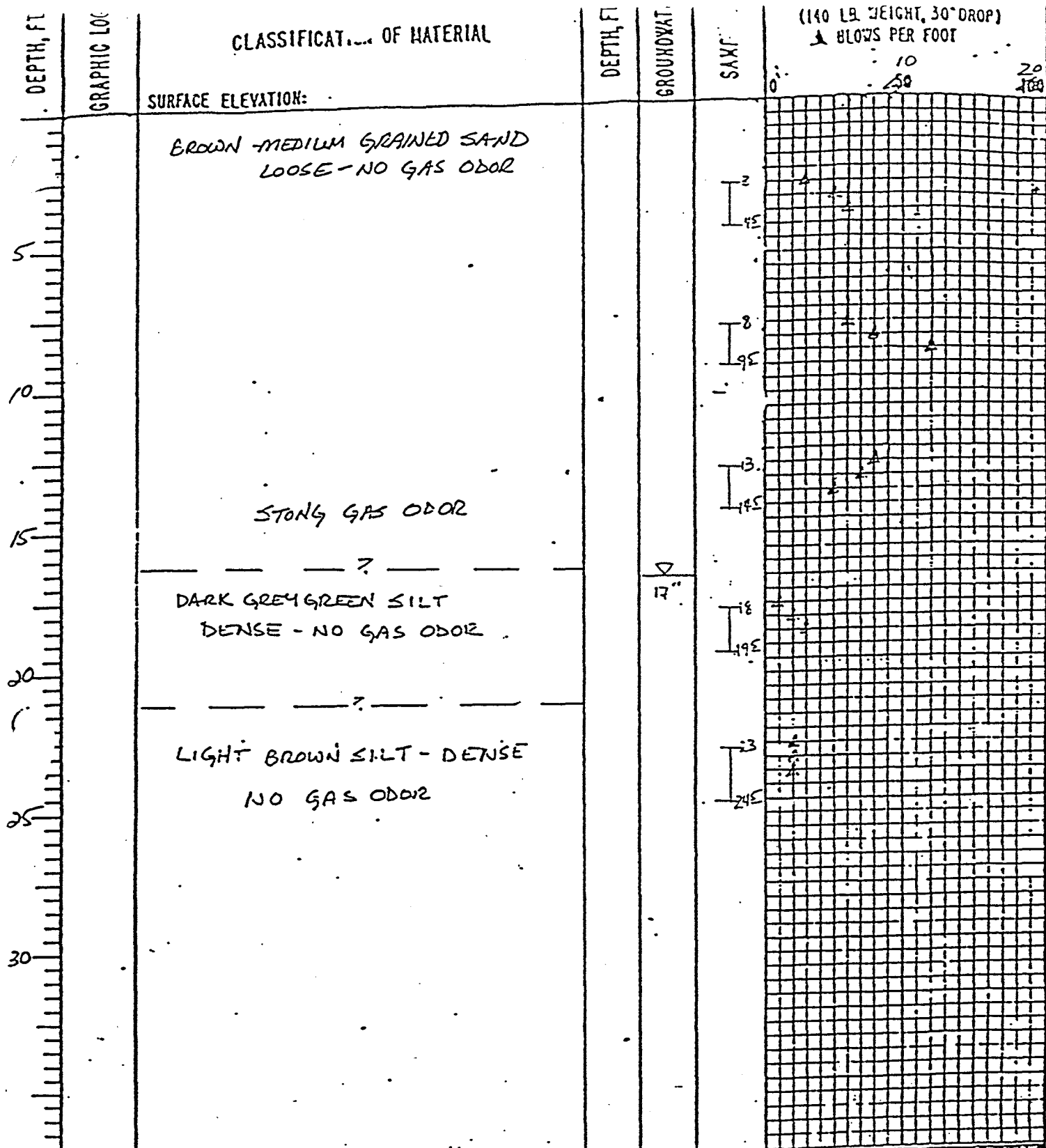
- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- KX CORE RUN
- \* SAMPLE NOT RECOVERED
- ▲ WATER LEVEL



BORING LOG U-2

DATE 3-19-85 JOB NO. 8204 FIG. 1/1

COP0020933



# LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- KX CORE RUN
- \* SAMPLE NOT RECOVERED
- ▲ WATER LEVEL



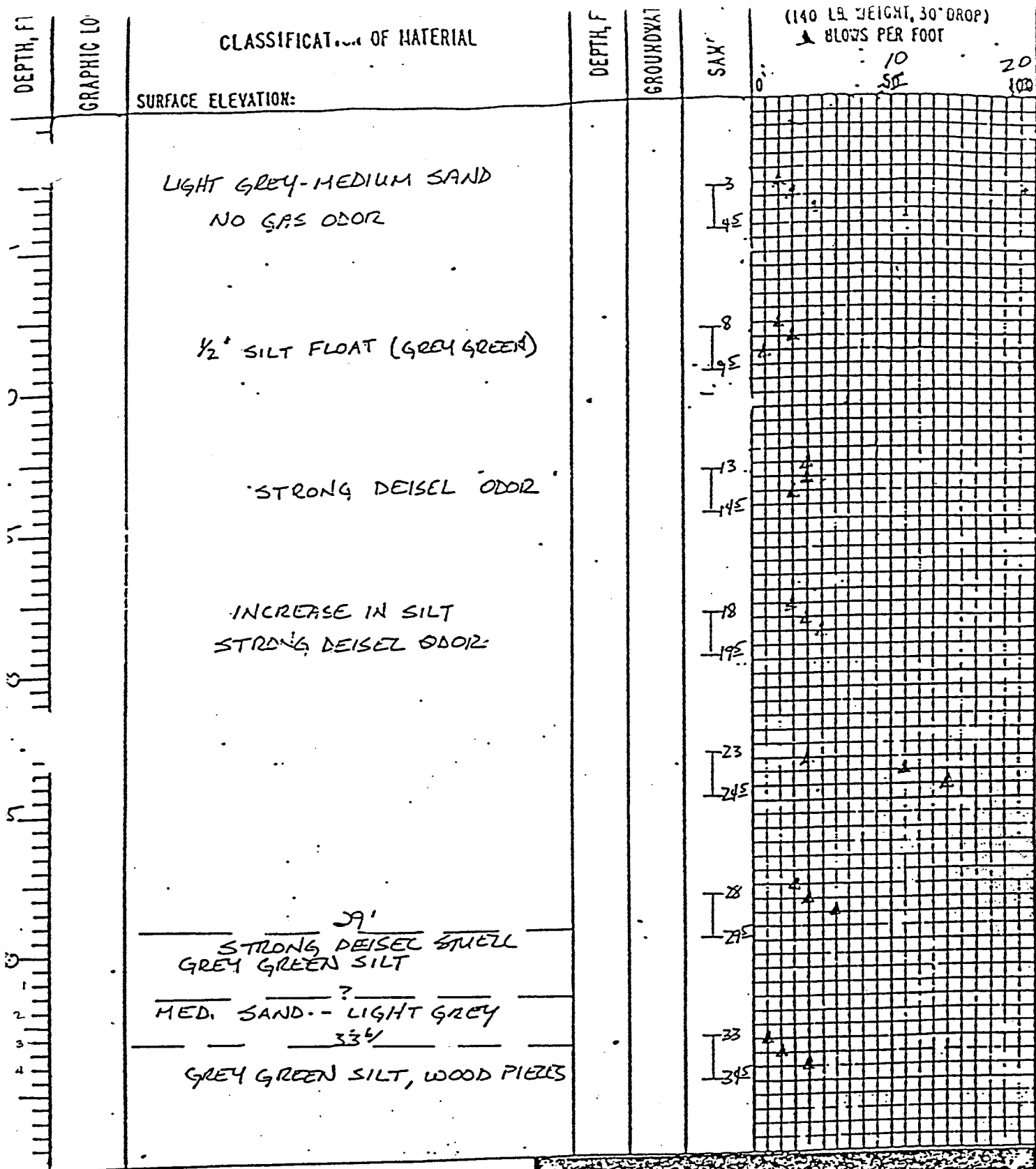
**RIEDEL  
INTERNATIONAL, INC.**

655 NICHANNE AVE.  
P.O. BOX 320 PORTLAND, OREGON 97208

BORING LOG u-3


DATE 3-20-85 JOB NO. 8204

FIG. 1/1



### LEGEND

- I 2.0" O.D. SPLIT SPOON SAMPLE
- II 3.0" O.D. THIN WALLED SAMPLE
- G GRAB SAMPLE OF DRILL CUTTINGS
- KX CORE RUN
- \* SAMPLE NOT RECOVERED
- ▽ WATER LEVEL

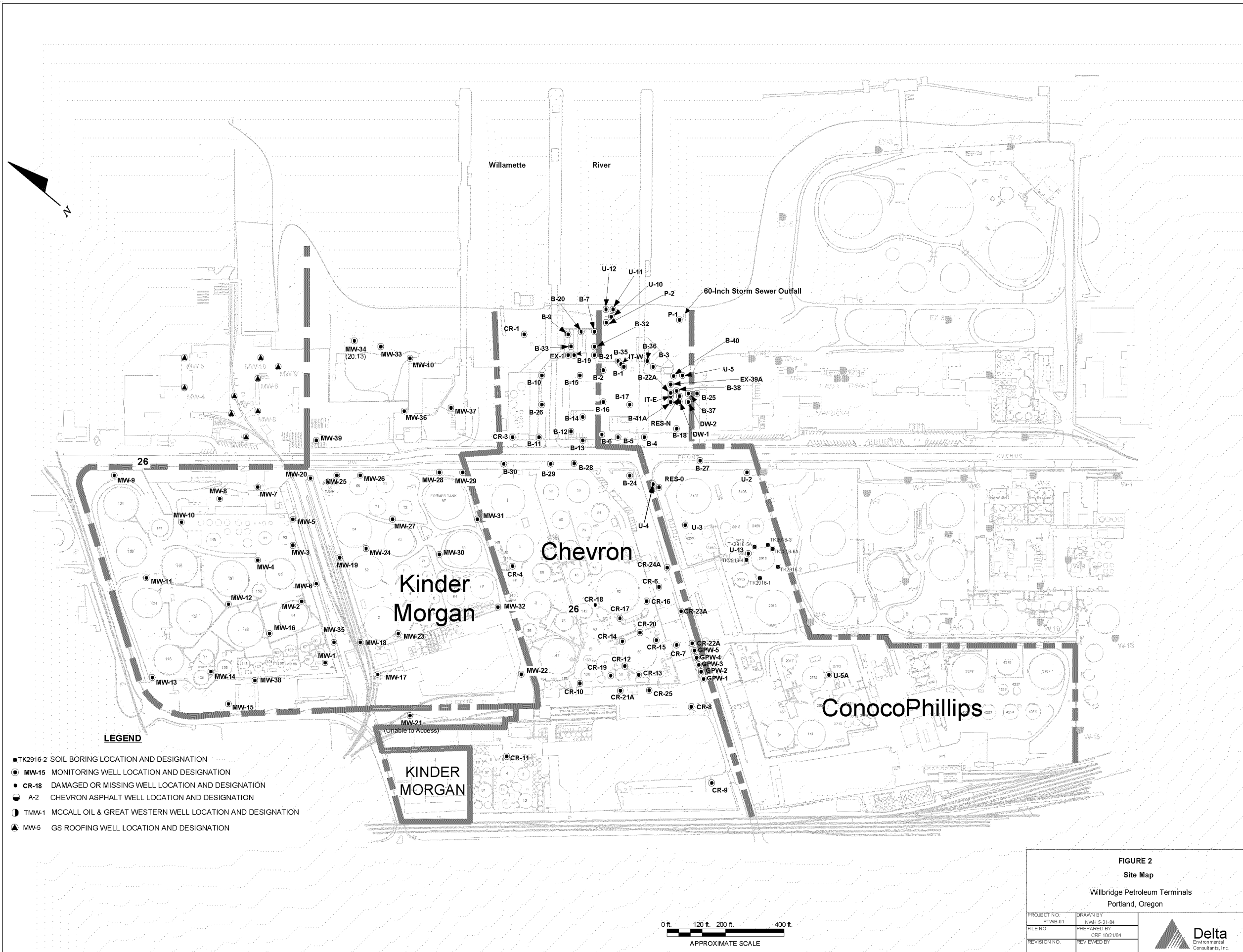


**RIEDEL INTERNATIONAL**  
 1511 CHANNEL AVE  
 P.O. BOX 3201 PORTLAND, OREGON 97208

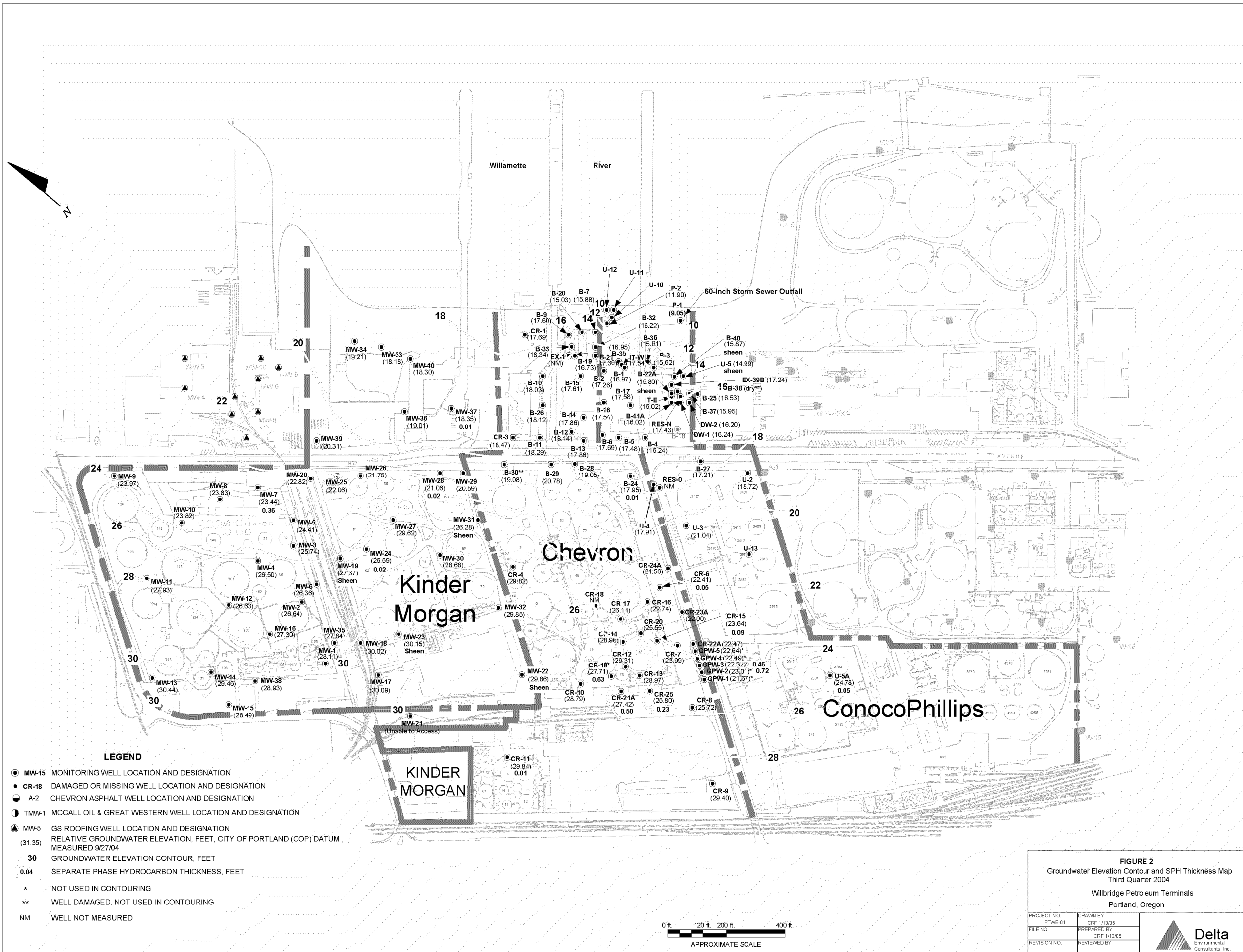
BORING LOG u-4

DATE 3-20-85 JOB NO. 2204 FIG. 1/1

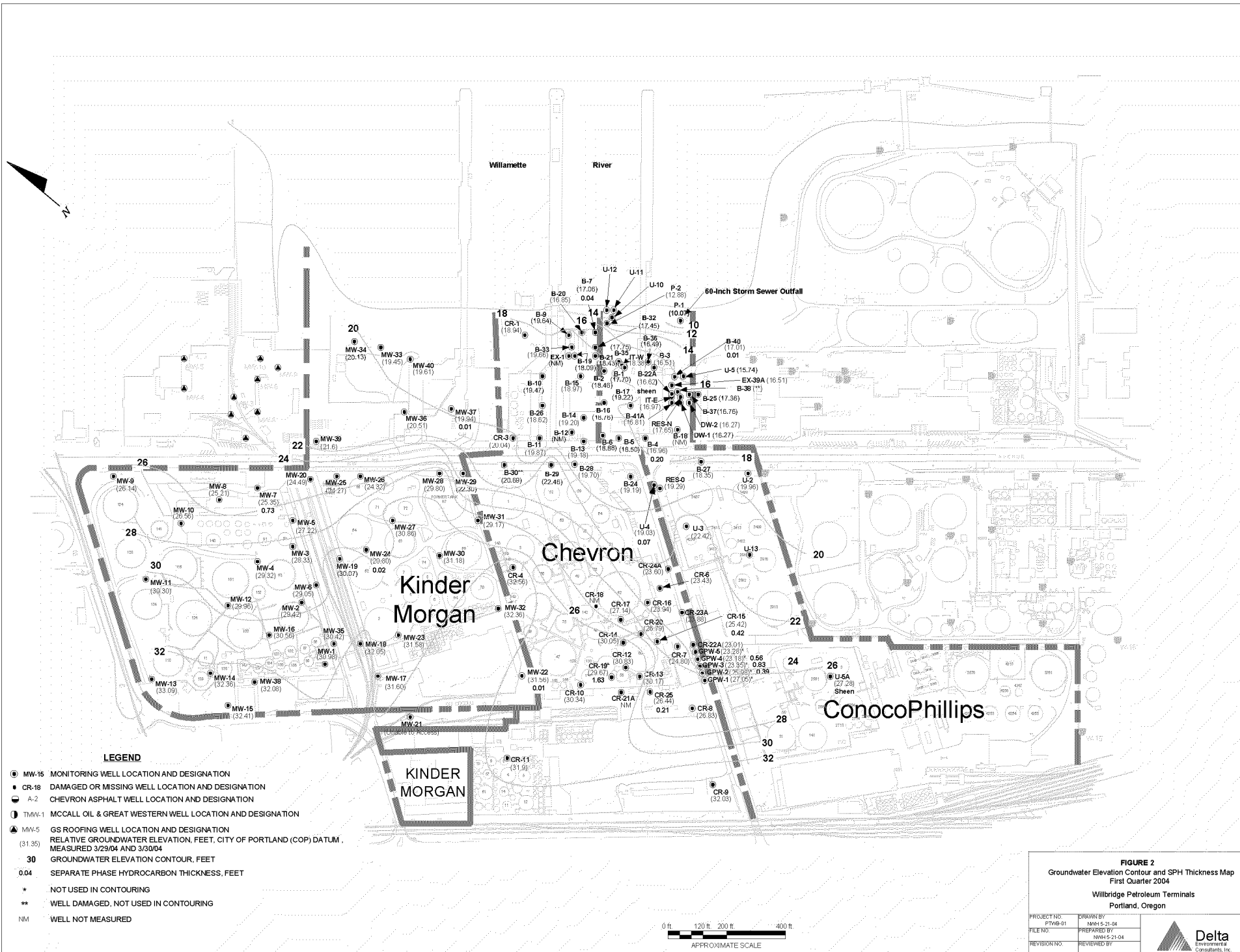












**SEMI ANNUAL GROUNDWATER MONITORING REPORT  
(April 2004 through September 2004)**

Willbridge Bulk Fuel Facilities

Portland, Oregon

Consent Order WMCSR-NWR-94-06  
Delta Project PTWB-02A-4

March 15, 2005

Prepared for:

Willbridge Terminal Group



***Delta Environmental Consultants, Inc.***

7150 SW Hampton Street, Tigard, Oregon 97223

503-639-8098

800 477 7411

**COP0020940**

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## **TABLES**

TABLE 1A – GROUNDWATER ELEVATION AND SPH RECOVERY DATA  
CHEVRONTExACO COMPANY

TABLE 1B – GROUNDWATER ELEVATION AND SPH RECOVERY DATA  
KINDER MORGAN LIQUID TERMINALS, LLC

TABLE 1C – GROUNDWATER ELEVATION AND SPH RECOVERY DATA  
CONOCOPHILLIPS COMPANY

TABLE 2 – GROUNDWATER ANALYTICAL RESULTS – BTEX COMPOUNDS

TABLE 3 – GROUNDWATER ANALYTICAL RESULTS – PAH COMPOUNDS

TABLE 4 – GROUNDWATER ANALYTICAL RESULTS – TOTAL METALS

## **FIGURES**

FIGURE 1 – SITE LOCATION MAP

FIGURE 2 – GROUNDWATER ELEVATION CONTOURS AND SPH THICKNESS MAP

FIGURE 3 – PRECIPITATION AND RIVER STAGE HYDROGRAPH

## **APPENDICES**

APPENDIX A – GROUNDWATER MONITORING AND SAMPLING PROCEDURES,  
CERTIFIED ANALYTICAL LABORATORY REPORTS AND  
CHAIN-OF-CUSTODY DOCUMENTATION

## **EXECUTIVE SUMMARY**

Delta Environmental Consultants, Inc. (Delta) performed monthly separate-phase hydrocarbon recovery, quarterly well gauging (June 2004 and September 2004), and semi-annual (September 2004) groundwater sampling as part of the remedial investigation/feasibility study work at the Willbridge Bulk Fuel Facilities (Willbridge Facility). The Willbridge Facility is comprised of terminals owned by ChevronTexaco Company (Chevron), Kinder Morgan Liquid Terminals, LLC (KMLT), and ConocoPhillips Company. This report fulfills the requirement of Section 7F of Oregon Department of Environmental Quality (DEQ) Consent Order WMCSR-NW-94-06.

## **1.0 GROUNDWATER MONITORING AND SAMPLING**

Groundwater monitoring and sampling activities, along with separate-phase hydrocarbon (SPH) recovery were performed at the Willbridge Facility from April 2004 through September 2004. The Willbridge Facility is located in northwest Portland, Oregon on Northwest Front Avenue, along the Willamette River. A site location map is presented as Figure 1.

Monitoring activities performed on June 24 and June 29, 2004 (Second Quarter) consisted of measuring depth to groundwater and SPH thickness in all wells. Monitoring and sampling activities performed on September 27 and 28, 2004 (Third Quarter) consisted of measuring depth to groundwater and SPH thickness in all wells, and collecting groundwater samples from select wells. Collected groundwater samples were analyzed for the presence of dissolved petroleum hydrocarbon constituents and selected metals. Monitoring and sampling activities are described in the following sections.

Based upon results of the previous quarterly monitoring activities, selected wells were monitored for the presence of SPH on a monthly basis. SPH recovery was performed on a monthly basis for wells containing measurable amounts of SPH between April 2004 and September 2004.

### **1.1 Hydrogeologic Analysis**

Depth-to-groundwater measurements were collected from each monitoring well in June 2004 and September 2004. Groundwater elevation data for the June 2004 and September 2004 monitoring events and monthly SPH recovery data for April 2004 through September 2004 are presented in Tables 1A through 1C. A map showing groundwater elevation contours and SPH thicknesses measured in wells in September 2004 is presented as Figure 2. Groundwater monitoring procedures are included in Appendix A.

During the second and third quarters of 2004, groundwater elevations across the facility ranged from approximately 9.05 feet to 30.89 feet above mean sea level. Groundwater flow direction is generally northeasterly, toward the Willamette River.

## **1.2 Willamette River**

The Willamette River stage (daily mean, measured at the Morrison Bridge river gauge and converted to the City of Portland datum) during the second quarter and third quarter of 2004 ranged from a high of 8.26 feet City of Portland Datum (COP) on June 2, 2004 to a low of 1.65 feet COP on September 6, 2004. The river stage averaged an elevation of approximately 4.46 feet COP between April 1 to September 30, 2004. Precipitation and river stage data are presented on Figure 3.

## **1.3 Groundwater Analytical Results**

Groundwater samples were collected from selected facility monitoring wells between September 27 and October 6, 2004, and analyzed in accordance with the consent order WMCSR-NWR-94-06 and the revised sampling agreement (May 11, 2001). The list of analytes included benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Method 8021B, polynuclear aromatic hydrocarbons (PAHs) using EPA Method 8270M-SIM, and total RCRA metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc) using EPA Method 6000/7000 Series Methods. Groundwater sampling procedures are presented in Appendix A. Samples were not collected from wells containing measurable quantities of SPH.

BTEX laboratory analytical results for the third quarter 2004 sampling event are presented in Table 2. PAH laboratory analytical results for the third quarter 2004 sampling event are presented in Table 3. Total metals laboratory analytical results for the third quarter 2004 sampling event are presented in Table 4. Laboratory analytical reports and chain-of-custody documentation are included in Appendix A.

#### **1.4 Separate Phase Hydrocarbon Occurrence**

Based upon the results of the previous quarterly monitoring activities, select wells were monitored for the presence of SPH on a monthly basis. SPH recovery was performed monthly on wells containing measurable amounts of SPH between April 2004 and September 2004. The detected SPH thicknesses measured during the June 2004 and September 2004 monitoring events are included in Table 1. SPH thicknesses measured during the September 2004 monitoring event are presented in Figure 2.

During quarterly groundwater monitoring in June 2004 and September 2004, Chevron Wells B-7, B-24, CR-6, CR-7, CR-10, CR-11, CR-15, CR-16, CR-19, CR-21A, CR-25, GPW-2, and GPW-3 contained measurable thicknesses of SPH, ranging from 0.01 foot in Well B-7 (June 2004) to 0.78 foot in Well CR-19 (June 2004). SPH thicknesses were generally consistent with historical measurements.

KMLT Wells MW-7, MW-24, and MW-37 contained measurable thicknesses of SPH, ranging from 0.01 foot in Well MW-37 (September 2004) to 0.56 foot in Well MW-7 (June 2004).

ConocoPhillips Well U-5A contained measurable thicknesses of SPH, 0.01 foot in June 2004 and 0.05 foot in September 2004.



## **2.0 Separate Phase Hydrocarbon Recovery**

Monthly manual recovery of SPH was initiated at the Willbridge Facility in February 1997. To determine which wells will be included in the monthly SPH recovery efforts, each well at the facility is monitored on a quarterly basis. SPH recovery is performed in each well where measurable SPH is observed during the previous quarterly gauging event. Manual SPH recovery consists of manual bailing, pumping, or the use of a sorbent sock installed in the well.

Approximately 150 gallons of SPH have been removed to date by the above-referenced manual recovery methods. Recovered SPH volumes for this reporting period (April 2004 through September 2004) totaled approximately 5 gallons. The SPH recovery data are presented in Table 1.

In November and December 2001, a "U"-shaped cut-off wall encompassing the stormwater trench backfill was installed. The cut-off wall was designed to intercept SPH and groundwater migrating along the dominant local groundwater flow path of the 60-inch diameter storm sewer trench backfill. The cut-off wall was constructed with 20-foot-long steel sheet-pile with sealed joints between the sheet-piles. A groundwater and SPH recovery system is used to extract groundwater and SPH from a series of wells located behind the cut-off wall.

In addition to the monthly SPH recovery events, SPH recovery has also been conducted near the outfall of the 60-inch diameter storm sewer. SPH recovery efforts were previously performed in this area by pumping from temporary recovery wells and a temporary recovery trench, but since December of 2001 is being performed using permanent recovery wells installed behind the cutoff wall. Approximately 4,026 gallons of SPH have been recovered to date from the backfill material around the storm sewer outfall since recovery efforts began in the year 2000. During the second and third quarters of 2004, SPH was continually recovered; however, the amount of SPH recovered is measured when the SPH is hauled off from the site for recycling. During the six month period covered by this report, SPH was not hauled from the site; therefore the amount recovered has not been measured.

## **2.1 Seep and Sheen Monitoring**

Containment booms currently border the shoreline between the Chevron and ConocoPhillips docks, and from the south edge of the ConocoPhillips dock to the southern property line (beyond the current Doane Avenue storm sewer outfall). Additionally, secondary and tertiary containment booms are located inside of the first boom around the current 60-inch Doane Avenue storm sewer outfall pipe.

### **3.0 Issues Encountered During the Second and Third Quarters 2004**

No notable issues occurred during this last reporting period.

#### **4.0 Activities Scheduled for the Fourth Quarter 2004 and First Quarter of 2005** **(October 2004 through March 2005)**

The following tasks are planned for the fourth quarter of 2004 and first quarter of 2005:

- Perform monthly SPH recovery from wells that have historically contained SPH.
- Measure depth to water and SPH in all Willbridge Facility wells during the fourth quarter 2004 and first quarter of 2005 monitoring events, scheduled for December 2004 (fourth quarter) and March 2005 (first quarter).
- Sample selected Willbridge Facility wells during the March (first quarter) 2005 sampling event.
- Submit RI Addendum to the DEQ.
- Submit MTBE Sampling Plan to the DEQ for the March 2005 sampling event.
- Meet with the DEQ to discuss the scope of the feasibility study.
- Operate the 60-inch storm sewer groundwater treatment system.
- Complete the permitting associated with the proposed sheet pile for installation across the area of the former 27-inch diameter storm sewer outfall. Continue the process to secure an access agreement with the Port of Portland or the Oregon Department of State Lands to install the sheet pile wall.

## 5.0 REMARKS

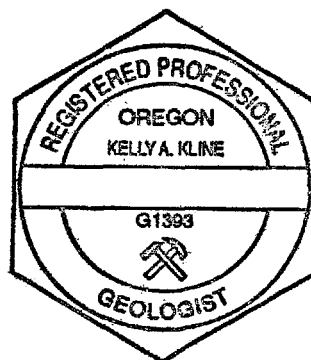
The services described in this report represent Delta's professional opinions based upon the currently available information and are arrived at in accordance with currently acceptable professional standards. This report is based upon a specific scope of work requested by the client. The Contract between Delta and its client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this report were performed. This report is intended only for the use of Delta's Client and anyone else specifically listed on this report. Delta will not and cannot be liable for unauthorized reliance by any other third party. Other than as contained in this paragraph, Delta makes no express or implied warranty as to the contents of this report.

This report was prepared by **DELTA ENVIRONMENTAL CONSULTANTS, INC.**

**Delta Environmental Consultants, Inc.**



Kelly A. Kline, R.G.  
Senior Geologist



R. Scott Miller, P.E.  
Senior Engineer

Delta Environmental Consultants, Inc.  
7150 SW Hampton Street, Suite 220  
Tigard, Oregon 97223

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-7</b>	2/14/2000	18.33	NP	-	17.40	0.1
(35.73)	5/22/2000	18.60	NP	-	17.13	NA
	8/22/2000	19.31	19.30	0.01	16.43	0.1
	11/27/2000	19.47	sheen	-	16.26	NA
	2/20/2001	19.37	NP	-	16.36	NA
	5/15/2001	19.36	sheen	-	16.37	NA
	9/19/2001	19.74	NP	-	15.99	NA
	12/20/2001	18.30	NP	-	17.43	NA
	3/15/2002	18.28	NP	-	17.45	NA
	9/23/2002	18.79	18.78	0.01	16.95	NA
	12/19/2002	19.78	19.79	0.01	15.96	NA
	3/19/2003	18.58	18.57	0.01	17.16	NA
	6/24/2003	19.02	18.97	0.05	16.75	NA
	9/24/2003	19.72	19.71	0.01	16.02	NA
	12/26/2003	18.90	18.85	0.05	16.87	NA
	3/30/2004	18.70	18.66	0.04	17.06	NA
	6/24/2004	19.19	19.18	0.01	16.55	NA
	9/27/2004	19.85	NP	-	15.88	NA
<b>B-9</b>	2/14/2000	16.29	16.20	0.09	19.35	0.0
(35.57)	5/22/2000	16.90	NP	-	18.67	NA
	8/22/2000	17.48	NP	-	18.09	NA
	11/27/2000	17.29	NP	-	18.28	NA
	2/20/2001	17.41	NP	-	18.16	NA
	5/15/2001	17.04	NP	-	18.53	NA
	9/19/2001	17.84	NP	-	17.73	NA
	12/20/2001	15.92	NP	-	19.65	NA
	3/5/2002	15.92	NP	-	19.65	NA
	9/23/2002	17.75	NP	-	17.82	NA
	12/19/2002	17.28	NP	-	18.29	NA
	3/19/2003	16.18	NP	-	19.39	NA
	6/24/2003	16.63	NP	-	18.94	NA
	9/24/2003	17.82	NP	-	17.75	NA
	12/26/2003	Well covered by truck				
	3/30/2004	15.93	NP	-	19.64	NA
	6/24/2004	17.12	NP	-	18.45	NA
	9/27/2004	17.97	NP	-	17.60	NA
<b>B-10</b>	2/14/2000	15.10	NP	-	19.66	NA
(34.76)	5/22/2000	15.67	NP	-	19.09	NA
	8/22/2000	16.35	NP	-	18.41	NA
	11/27/2000	16.64	NP	-	18.12	NA
	2/20/2001	16.41	NP	-	18.35	NA
	5/15/2001	16.42	NP	-	18.34	NA
	9/19/2001	16.95	NP	-	17.81	NA
	12/20/2001	15.42	NP	-	19.34	NA
	3/15/2002	14.99	NP	-	19.77	NA
	9/23/2002	16.64	NP	-	18.12	NA
	12/19/2002	16.56	NP	-	18.20	NA
	3/19/2003	15.24	NP	-	19.52	NA
	6/24/2003	15.70	NP	-	19.06	NA
	9/24/2003	16.62	NP	-	18.14	NA
	12/26/2003	15.98	NP	-	18.78	NA
	6/24/2004	16.13	NP	-	18.63	NA
	9/27/2004	16.73	NP	-	18.03	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-11</b> (34.96)	3/30/2004	15.29	NP		19.47	NA
	5/22/2000	15.41	NP	-	19.55	NA
	8/22/2000	16.14	NP	-	18.82	NA
	11/27/2000	16.57	NP	-	18.39	0.1
	2/20/2001	16.30	sheen	-	18.66	NA
	5/15/2001	16.30	NP	-	18.66	NA
	9/19/2001	16.82	NP	-	18.14	NA
	12/20/2001	15.44	NP	-	19.52	NA
	3/15/2002	14.80	NP	-	20.16	NA
	9/23/2002	16.49	NP	-	18.47	NA
	12/19/2002	16.61	sheen	-	18.35	NA
	3/19/2003	15.11	NP	-	19.85	NA
	6/24/2003	15.52	NP	-	19.44	NA
	9/24/2003	16.48	NP	-	18.48	NA
	12/26/2003	15.85	NP	-	19.11	NA
	3/30/2004	15.09	NP	-	19.87	NA
	6/24/2004	15.98	NP	-	18.98	NA
	9/27/2004	16.67	NP	-	18.29	NA
<b>B-12</b> (35.14)	2/14/2000	15.38	NP	-	19.76	NA
	5/22/2000	15.85	NP	-	19.29	NA
	8/22/2000	16.55	NP	-	18.59	NA
	11/27/2000	16.98	NP	-	18.16	NA
	2/20/2001	16.73	NP	-	18.41	NA
	5/15/2001	16.72	NP	-	18.42	NA
	9/19/2001	17.20	NP	-	17.94	NA
	12/20/2001	15.94	NP	-	19.20	NA
	3/15/2002	15.32	NP	-	19.82	NA
	9/23/2002	16.89	NP	-	18.25	NA
	12/19/2002	17.01	NP	-	18.13	NA
	3/19/2003	15.56	NP	-	19.58	NA
	6/24/2003	Not Located				
	9/24/2003	Not Located				
	12/26/2003	Not Located				
	3/30/2004	Not Located				
	6/24/2004	16.40	NP	-	18.74	NA
	9/27/2004	17.00	NP	-	18.14	NA
<b>B-13</b> (34.76)	2/14/2000	15.46	NP	-	19.30	NA
	5/22/2000	15.86	NP	-	18.90	NA
	8/22/2000	16.46	NP	-	18.30	NA
	11/27/2000	19.91	NP	-	14.85	NA
	2/20/2001	16.65	NP	-	18.11	NA
	5/15/2001	16.65	NP	-	18.11	NA
	9/19/2001	17.09	NP	-	17.67	NA
	12/22/2001	15.94	NP	-	18.82	NA
	3/15/2002	15.37	NP	-	19.39	NA
	9/23/2002	16.82	NP	-	17.94	NA
	12/19/2002	16.95	NP	-	17.81	NA
	3/19/2003	15.62	NP	-	19.14	NA
	6/24/2003	15.96	NP	-	18.80	NA
	9/24/2003	16.82	NP	-	17.94	NA
	12/26/2003	16.29	NP	-	18.47	NA
	3/30/2004	15.58	NP	-	19.18	NA
	6/24/2004	16.34	NP	-	18.42	NA
	9/27/2004	16.90	NP	-	17.86	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-14</b>	2/14/2000	17.27	NP	-	19.32	NA
(36.59)	5/22/2000	17.69	NP	-	18.90	NA
	8/22/2000	18.31	NP	-	18.28	NA
	11/27/2000	18.72	NP	-	17.87	NA
	2/20/2001	18.50	NP	-	18.09	NA
	5/15/2001	18.49	NP	-	18.10	NA
	9/19/2001	18.87	NP	-	17.72	NA
	12/22/2001	17.74	NP	-	18.85	NA
	3/15/2002	17.21	NP	-	19.38	NA
	9/23/2002	18.64	NP	-	17.95	NA
	12/19/2002	18.79	NP	-	17.80	NA
	3/19/2003	17.47	NP	-	19.12	NA
	6/24/2003	17.78	NP	-	18.81	NA
	9/24/2003	18.64	NP	-	17.95	NA
	12/26/2003	18.10	NP	-	18.49	NA
	3/30/2004	17.39	NP	-	19.20	NA
	6/24/2004	18.17	NP	-	18.42	NA
	9/27/2004	18.73	NP	-	17.86	NA
<b>B-15</b>	2/14/2000	16.48	NP	-	19.07	NA
(35.55)	5/22/2000	16.88	NP	-	18.67	NA
	8/22/2000	17.53	NP	-	18.02	NA
	11/27/2000	17.89	NP	-	17.66	NA
	2/20/2001	17.38	NP	-	18.17	NA
	5/15/2001	17.66	NP	-	17.89	NA
	9/19/2001	18.12	NP	-	17.43	NA
	12/20/2001	16.92	NP	-	18.63	NA
	3/15/2002	16.36	NP	-	19.19	NA
	9/23/2002	17.84	NP	-	17.71	NA
	12/19/2002	18.01	NP	-	17.54	NA
	3/19/2003	16.66	NP	-	18.89	NA
	6/24/2003	16.98	NP	-	18.57	NA
	9/24/2003	17.84	NP	-	17.71	NA
	12/26/2003	17.27	NP	-	18.28	NA
	3/30/2004	16.58	NP	-	18.97	NA
	6/24/2004	17.37	NP	-	18.18	NA
	9/27/2004	17.94	NP	-	17.61	NA
<b>B-19</b>	2/14/2000	15.99	NP	-	18.18	NA
(34.17)	5/22/2000	16.34	NP	-	17.83	NA
	8/22/2000	17.04	NP	-	17.13	NA
	11/27/2000	17.35	NP	-	16.82	NA
	2/20/2001	17.17	NP	-	17.00	NA
	5/15/2001	17.14	NP	-	17.03	NA
	9/19/2001	17.67	NP	-	16.50	NA
	12/20/2001	16.32	NP	-	17.85	NA
	3/15/2002	15.88	NP	-	18.29	NA
	9/23/2002	17.37	NP	-	16.80	NA
	12/19/2002	18.47	NP	-	15.70	NA
	3/19/2003	16.13	NP	-	18.04	NA
	6/24/2003	16.50	NP	-	17.67	NA
	9/24/2003	17.35	NP	-	16.82	NA
	12/26/2003	16.71	NP	-	17.46	NA
	3/30/2004	16.08	NP	-	18.09	NA
	6/24/2004	16.87	NP	-	17.30	NA
	9/27/2004	17.44	NP	-	16.73	NA



**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-20</b>	2/14/2000	16.62	NP	-	16.70	NA
(33.32)	5/22/2000	16.93	NP	-	16.39	NA
	8/22/2000	17.78	NP	-	15.54	NA
	11/27/2000	17.99	sheen	-	15.33	NA
	2/20/2001	17.79	sheen	-	15.53	NA
	5/15/2001	17.89	NP	-	15.43	NA
	9/19/2001	18.40	NP	-	14.92	NA
	12/20/2001	16.61	NP	-	16.71	NA
	3/15/2002	16.45	NP	-	16.87	NA
	9/23/2002	18.27	NP	-	15.05	NA
	12/19/2002	18.22	NP	-	15.10	NA
	3/19/2003	15.96	NP	-	17.36	NA
	6/24/2003	17.06	NP	-	16.26	NA
	9/24/2003	18.30	NP	-	15.02	NA
	12/26/2003	17.31	NP	-	16.01	NA
	3/30/2004	16.47	NP	-	16.85	NA
	6/24/2004	17.32	NP	-	16.00	NA
	9/27/2004	18.29	NP	-	15.03	NA
<b>B-21</b>	2/14/2000	16.22	NP	-	18.57	NA
(34.79)	5/22/2000	16.57	NP	-	18.22	NA
	8/22/2000	17.15	NP	-	17.64	NA
	11/27/2000	17.45	NP	-	17.34	NA
	2/20/2001	19.29	NP	-	15.50	NA
	5/15/2001	17.27	NP	-	17.52	NA
	9/19/2001	17.66	NP	-	17.13	NA
	12/20/2001	16.48	NP	-	18.31	NA
	3/15/2002	16.18	NP	-	18.61	NA
	9/23/2002	17.45	NP	-	17.34	NA
	12/19/2002	17.56	NP	-	17.23	NA
	3/19/2003	16.35	NP	-	18.44	NA
	6/24/2003	16.70	NP	-	18.09	NA
	9/24/2003	17.42	NP	-	17.37	NA
	12/26/2003	16.91	NP	-	17.88	NA
	3/30/2004	16.36	NP	-	18.43	NA
	6/24/2004	17.02	NP	-	17.77	NA
	9/27/2004	17.49	NP	-	17.30	NA
<b>B-24</b>	2/14/2000	15.50	15.49	0.01	19.21	0.0
(34.70)	5/22/2000	15.83	NP	-	18.87	NA
	8/22/2000	16.38	NP	-	18.32	NA
	11/27/2000	16.81	NP	-	17.89	NA
	2/20/2001	16.59	NP	-	18.11	NA
	5/15/2001	16.56	NP	-	18.14	NA
	9/19/2001	16.94	NP	-	17.76	NA
	12/22/2001	16.23	16.07	0.16	18.60	0.0
	3/15/2002	15.54	Sheen	-	19.16	0.0
	9/23/2002	16.86	16.73	0.13	17.94	0.0
	12/19/2002	16.98	NP	-	17.72	NA
	3/19/2003	15.84	15.71	0.13	18.96	0.0
	6/24/2003	15.90	Sheen	-	18.80	0.0
	9/24/2003	16.75	16.71	0.04	17.98	0.0
	12/26/2003	16.32	16.29	0.03	18.40	0.0
	3/30/2004	15.51	NP	-	19.19	NA
	6/24/2004	16.58	16.21	0.37	18.42	NA
	9/27/2004	16.76	16.75	0.01	17.95	0.0

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-26</b>	2/14/2000	15.49	NP	-	19.81	NA
(35.30)	5/22/2000	15.96	NP	-	19.34	NA
	8/22/2000	16.72	NP	-	18.58	NA
	11/27/2000	17.11	NP	-	18.19	NA
	2/20/2001	16.86	NP	-	18.44	NA
	5/15/2001	16.86	NP	-	18.44	NA
	9/19/2001	17.37	NP	-	17.93	NA
	12/20/2001	15.93	NP	-	19.37	NA
	3/15/2002	15.41	NP	-	19.89	NA
	9/23/2002	17.06	NP	-	18.24	NA
	12/19/2002	17.10	NP	-	18.20	NA
	3/19/2003	15.69	NP	-	19.61	NA
	6/24/2003	16.13	NP	-	19.17	NA
	9/24/2003	17.06	NP	-	18.24	NA
	12/26/2003	16.39	NP	-	18.91	NA
	3/30/2004	16.68	NP	-	18.62	NA
	6/24/2004	16.54	NP	-	18.76	NA
	9/27/2004	17.18	NP	-	18.12	NA
<b>B-28</b>	2/14/2000	15.45	NP	-	19.81	NA
(35.26)	5/22/2000	14.34	NP	-	20.92	NA
	8/22/2000	16.11	NP	-	19.15	NA
	11/27/2000	16.36	NP	-	18.90	NA
	2/20/2001	16.14	NP	-	19.12	NA
	5/15/2001	16.07	NP	-	19.19	NA
	9/19/2001	16.25	NP	-	19.01	NA
	12/22/2001	15.97	NP	-	19.29	NA
	3/15/2002	15.36	NP	-	19.90	NA
	9/23/2002	16.36	NP	-	18.90	NA
	12/19/2002	16.35	NP	-	18.91	NA
	3/19/2003	15.69	NP	-	19.57	NA
	6/24/2003	15.93	NP	-	19.33	NA
	9/24/2003	16.31	NP	-	18.95	NA
	12/26/2003	16.39	NP	-	18.87	NA
	3/30/2004	15.56	NP	-	19.70	NA
	6/24/2004	16.13	NP	-	19.13	NA
	9/27/2004	16.21	NP	-	19.05	NA
<b>B-29</b>	2/14/2000	15.12	NP	-	22.58	NA
(37.70)	5/22/2000	15.43	NP	-	22.27	NA
	8/22/2000	16.24	NP	-	21.46	NA
	11/27/2000	16.63	NP	-	21.07	NA
	2/20/2001	16.27	NP	-	21.43	NA
	5/15/2001	16.22	NP	-	21.48	NA
	9/19/2001	16.80	NP	-	20.90	NA
	12/22/2001	15.68	NP	-	22.02	NA
	3/15/2002	14.98	NP	-	22.72	NA
	9/23/2002	16.73	NP	-	20.97	NA
	12/19/2002	16.82	NP	-	20.88	NA
	3/19/2003	15.28	NP	-	22.42	NA
	6/24/2003	15.60	NP	-	22.10	NA
	9/24/2003	16.59	NP	-	21.11	NA
	12/26/2003	15.11	NP	-	22.59	NA
	3/30/2004	15.24	NP	-	22.46	NA
	6/24/2004	16.28	NP	-	21.42	NA
	9/27/2004	16.92	NP	-	20.78	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-30</b>	2/14/2000	14.76	NP	-	20.63	NA
(35.39)	5/22/2000	15.85	NP	-	19.54	NA
	8/22/2000	16.08	NP	-	19.31	NA
	11/27/2000	16.37	NP	-	19.02	NA
	2/20/2001	15.92	NP	-	19.47	NA
	5/15/2001	15.95	NP	-	19.44	NA
	9/19/2001	16.52	NP	-	18.87	NA
	12/22/2001	14.96	NP	-	20.43	NA
	3/15/2002	14.96	NP	-	20.43	NA
	9/23/2002	16.19	NP	-	19.20	NA
	12/19/2002	16.31	NP	-	19.08	NA
	3/19/2003	14.67	NP	-	20.72	NA
	6/24/2003	15.05	NP	-	20.34	NA
	9/24/2003	16.13	NP	-	19.26	NA
	12/26/2003	15.56	NP	-	19.83	NA
	3/30/2004	14.70	NP	-	20.69	NA
	6/24/2004	15.60	NP	-	19.79	NA
	9/27/2004	16.31	NP	-	19.08	NA
<b>B-32</b>	2/14/2000	16.37	NP	-	17.86	NA
(34.23)	5/22/2000	26.84	NP	-	7.39	NA
	8/22/2000	17.65	NP	-	16.58	NA
	11/27/2000	17.93	NP	-	16.30	NA
	2/20/2001	17.71	NP	-	16.52	NA
	5/15/2001	17.74	NP	-	16.49	NA
	9/19/2001	18.17	NP	-	16.06	NA
	12/20/2001	16.74	NP	-	17.49	NA
	3/15/2002	16.55	NP	-	17.68	NA
	9/23/2002	18.32	18.32	Sheen	15.91	NA
	12/19/2002	18.15	NP	-	16.08	NA
	3/19/2003	16.83	NP	-	17.40	NA
	6/24/2003	17.09	NP	-	17.14	NA
	9/24/2003	17.99	NP	-	16.24	NA
	12/26/2003	17.20	NP	-	17.03	NA
	3/30/2004	16.78	NP	-	17.45	NA
	6/24/2004	17.41	NP	-	16.82	NA
	9/27/2004	18.01	NP	-	16.22	NA
<b>B-33</b>	2/14/2000	15.54	15.49	0.05	20.40	0.0
(35.90)	5/22/2000	16.41	NP	-	19.49	NA
	8/22/2000	17.15	NP	-	18.75	NA
	11/27/2000	17.39	NP	-	18.51	NA
	2/20/2001	17.25	NP	-	18.65	NA
	5/15/2001	17.24	NP	-	18.66	NA
	9/19/2001	17.72	NP	-	18.18	NA
	12/20/2001	16.29	NP	-	19.61	NA
	3/15/2002	15.93	NP	-	19.97	NA
	9/23/2002	17.51	NP	-	18.39	NA
	12/19/2002	17.52	NP	-	18.38	NA
	3/19/2003	16.21	NP	-	19.69	NA
	6/24/2003	16.57	NP	-	19.33	NA
	9/24/2003	17.45	NP	-	18.45	NA
	12/26/2003	16.74	NP	-	19.16	NA
	3/30/2004	16.24	NP	-	19.66	NA
	6/24/2004	16.87	NP	-	19.03	NA
	9/27/2004	17.56	NP	-	18.34	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-1</b>	2/14/2000	2.38	NP	-	19.70	NA
(22.08)	5/22/2000	3.26	NP	-	18.82	NA
	8/22/2000	4.32	NP	-	17.76	NA
	11/27/2000	4.38	NP	-	17.70	NA
	2/20/2001	6.50	NP	-	15.58	NA
	5/15/2001	4.25	NP	-	17.83	NA
	9/19/2001	4.79	NP	-	17.29	NA
	12/22/2001	3.05	NP	-	19.03	NA
	3/15/2002	2.77	NP	-	19.31	NA
	9/23/2002	4.34	NP	-	17.74	NA
	12/19/2002	3.84	NP	-	18.24	NA
	3/19/2003	2.85	NP	-	19.23	NA
	6/24/2003	3.38	NP	-	18.70	NA
	9/24/2003	4.33	NP	-	17.75	NA
	12/26/2003	3.32	NP	-	18.76	NA
	3/30/2004	3.14	NP	-	18.94	NA
	6/24/2004	3.68	NP	-	18.40	NA
	9/27/2004	4.39	NP	-	17.69	NA
<b>CR-3</b>	2/14/2000	12.29	12.28	0.01	22.04	0.0
(34.32)	5/22/2000	16.57	NP	-	17.75	NA
	8/22/2000	15.34	NP	-	18.98	NA
	11/27/2000	13.86	NP	-	20.46	NA
	2/20/2001	15.46	NP	-	18.86	NA
	5/15/2001	15.37	NP	-	18.95	NA
	9/19/2001	16.03	NP	-	18.29	NA
	12/22/2001	14.50	NP	-	19.82	NA
	3/15/2002	13.93	NP	-	20.39	NA
	9/23/2002	15.70	NP	-	18.62	NA
	12/19/2002	15.40	NP	-	18.92	NA
	3/19/2003	14.27	NP	-	20.05	NA
	6/24/2003	14.70	NP	-	19.62	NA
	9/24/2003	15.67	NP	-	18.65	NA
	12/26/2003	14.71	NP	-	19.61	NA
	3/30/2004	14.28	NP	-	20.04	NA
	6/24/2004	15.17	NP	-	19.15	NA
	9/27/2004	15.85	NP	-	18.47	NA
<b>CR-4</b>	2/14/2000	5.08	NP	-	32.06	NA
(37.14)	5/22/2000	5.63	NP	-	31.51	NA
	8/22/2000	7.25	NP	-	29.89	NA
	11/27/2000	8.31	NP	-	28.83	NA
	2/20/2001	6.98	NP	-	30.16	NA
	5/15/2001	6.34	NP	-	30.80	NA
	9/19/2001	8.55	NP	-	28.59	NA
	12/20/2001	5.38	NP	-	31.76	NA
	3/15/2002	4.88	NP	-	32.26	NA
	6/4/2002	6.17	NP	-	30.97	NA
	9/23/2002	7.69	NP	-	29.45	NA
	12/19/2002	7.92	NP	-	29.22	NA
	3/19/2003	4.97	NP	-	32.17	NA
	6/24/2003	5.98	NP	-	31.16	NA
	9/24/2003	7.77	NP	-	29.37	NA
	12/26/2003	4.73	NP	-	32.41	NA
	3/30/2004	4.58	NP	-	32.56	NA
	6/24/2004	6.68	NP	-	30.46	NA
	9/27/2004	7.32	NP	-	29.82	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-6</b> (35.61)	2/14/2000	11.75	NP	-	23.86	NA
	5/22/2000	12.20	NP	-	23.41	NA
	8/22/2000	13.11	NP	-	22.50	NA
	11/27/2000	NM	NM	-	-	NA
	2/20/2001	13.12	13.11	0.01	22.50	0.0 **
	5/15/2001	12.90	NP	-	22.71	NA **
	9/19/2001	13.95	13.91	0.04	21.69	0.0 **
	12/20/2001	13.02	NP	-	22.59	NA
	3/15/2002	11.54	NP	-	24.07	NA
	6/4/2002	12.70	12.69	0.01	22.92	NA
	9/23/2002	14.56	NP	-	21.05	NA
	12/19/2002	13.26	13.23	0.03	22.37	0.04
	3/19/2003	12.01	11.99	0.02	23.62	0.0
	6/24/2003	12.75	12.73	0.02	22.88	0.0
	9/24/2003	13.43	13.40	0.03	22.20	0.0
	12/26/2003	12.73	12.69	0.04	22.91	0.0
	3/30/2004	12.18	sheen	-	23.43	0.0
	6/24/2004	13.21	13.17	0.04	22.43	NA
	9/27/2004	13.24	13.19	0.05	22.41	NA
<b>CR-7</b> (35.57)	2/14/2000	9.46	9.45	0.01	26.12	0.0
	5/22/2000	10.09	NP	-	25.48	NA
	8/22/2000	16.34	NP	-	19.23	NA
	11/27/2000	NM	NM	-	NM	-
	2/20/2001	11.30	sheen	-	24.27	0.0
	5/15/2001	11.21	NP	-	24.36	NA
	9/19/2001	12.46	NP	-	23.11	NA
	12/20/2001	9.92	NP	-	25.65	NA
	3/15/2002	9.60	NP	-	25.97	NA
	6/4/2002	11.01	11.00	0.01	24.57	NA
	9/23/2002	12.23	NP	-	23.34	NA
	12/19/2002	11.45	NP	-	24.12	NA
	3/19/2003	10.53	NP	-	25.04	NA
	6/24/2003	11.23	NP	-	24.34	NA
	9/24/2003	12.60	12.58	0.02	22.99	NA
	12/26/2003	10.90	NP	-	24.67	NA
	3/30/2004	10.77	NP	-	24.80	NA
	6/24/2004	11.78	11.75	0.03	23.81	NA
	9/27/2004	11.58	NP	-	23.99	NA
<b>CR-8</b> (33.14)	2/14/2000	5.70	NP	-	27.44	NA
	5/22/2000	6.23	NP	-	26.91	NA
	8/22/2000	7.44	NP	-	25.70	NA
	11/27/2000	7.61	NP	-	25.53	NA
	2/20/2001	7.03	NP	-	26.11	NA
	5/15/2001	6.98	NP	-	26.16	NA
	9/19/2001	8.29	NP	-	24.85	NA
	12/20/2001	6.18	NP	-	26.96	NA
	3/15/2002	5.77	NP	-	27.37	NA
	6/4/2002	6.82	NP	-	26.32	NA
	9/23/2002	8.04	NP	-	25.10	NA
	12/19/2002	7.36	NP	-	25.78	NA
	3/19/2003	6.12	NP	-	27.02	NA
	6/24/2003	6.84	NP	-	26.30	NA
	9/24/2003	8.24	NP	-	24.90	NA
	12/26/2003	6.99	NP	-	26.15	NA
	3/30/2004	6.31	NP	-	26.83	NA
	6/24/2004	7.19	NP	-	25.95	NA
	9/27/2004	7.42	NP	-	25.72	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-9</b>	2/14/2000	3.02	NP	-	32.70	NA
(35.72)	5/22/2000	3.78	NP	-	31.94	NA
	8/22/2000	6.51	NP	-	29.21	NA
	11/27/2000	5.20	NP	-	30.52	NA
	2/20/2001	4.71	NP	-	31.01	NA
	5/15/2001	4.95	NP	-	30.77	NA
	9/19/2001	7.26	NP	-	28.46	NA
	12/20/2001	3.47	NP	-	32.25	NA
	3/15/2002	3.25	NP	-	32.47	NA
	9/23/2002	7.11	NP	-	28.61	NA
	12/19/2002	4.35	NP	-	31.37	NA
	3/19/2003	3.46	NP	-	32.26	NA
	6/24/2003	5.95	NP	-	29.77	NA
	9/24/2003	6.82	NP	-	28.90	NA
	12/26/2003	3.53	NP	-	32.19	NA
	3/30/2004	3.69	NP	-	32.03	NA
	6/24/2004	6.06	NP	-	29.66	NA
	9/27/2004	6.32	NP	-	29.40	NA
<b>CR-10</b>	2/14/2000	4.12	4.08	0.04	31.48	0.0
(35.57)	5/22/2000	4.95	NP	-	30.62	NA
	8/22/2000	7.00	6.74	0.26	28.78	0.9
	11/27/2000	NM	NM	-	-	1.1
	2/20/2001	6.27	6.03	0.24	29.49	0.5
	5/15/2001		Covered With a Gravel Pile			0.5
	9/19/2001	10.68	7.92	2.76	27.10	NR ***
	12/22/2001	4.18	4.12	0.06	31.44	NR ***
	3/15/2002	4.03	3.95	0.08	31.60	0.1
	6/4/2002	5.72	5.55	0.17	29.99	0.1
	9/23/2002	9.13	7.04	2.09	28.11	3.0
	12/19/2002	7.44	6.35	1.09	29.00	0.53
	3/19/2003	4.25	4.21	0.04	31.35	0.26
	6/24/2003	5.69	5.58	0.11	29.97	0.05
	9/24/2003	8.15	7.41	0.74	28.01	0.53
	12/26/2003	6.45	4.75	1.70	30.48	6.0
	3/30/2004	5.23	NP	-	30.34	Skimmer
	6/24/2004	6.81	6.79	0.02	28.78	Skimmer
	9/27/2004	6.78	NP	-	28.79	Skimmer
<b>CR-11</b>	2/14/2000	2.06	NP	-	32.37	NA
(34.43)	5/22/2000	2.04	NP	-	32.39	NA
	8/22/2000	4.13	NP	-	30.30	NA
	11/27/2000	4.47	sheen	-	29.96	0.1
	2/20/2001	3.27	NP	-	31.16	NA
	5/15/2001	3.02	NP	-	31.41	NA
	9/19/2001	5.26	NP	-	29.17	NA
	12/20/2001	2.34	NP	-	32.09	NA
	3/15/2002	2.02	NP	-	32.41	NA
	9/23/2002	5.12	NP	-	29.31	NA
	12/19/2002	3.86	3.84	0.02	30.59	NA
	3/19/2003	2.06	NP	-	32.37	NA
	6/24/2003	3.25	NP	-	31.18	NA
	9/24/2003	4.80	NP	-	29.63	NA
	12/26/2003		well obstructed			
	3/30/2004	2.53	NP	-	31.90	NA
	6/24/2004	3.85	3.84	0.01	30.59	NA
	9/27/2004	4.60	4.59	0.01	29.84	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-12</b> (35.59)	6/9/1999	4.85	NP	-	30.74	NA
	7/8/1999	5.08	NP	-	30.51	NA
	8/16/1999	5.63	NP	-	29.96	NA
	9/20/1999	8.90	NP	-	26.69	NA
	2/9/2000	2.66	NP	-	32.93	NA
	5/9/2000	4.44	NP	-	31.15	NA
	5/15/2000	4.12	NP	-	31.47	NA
	7/11/2000	5.21	NP	-	30.38	NA
	8/14/2000	5.76	NP	-	29.83	NA
	12/12/2000	5.61	NP	-	29.98	NA
	4/3/2001	5.49	NP	-	30.10	NA
	6/8/2001	Covered With a Gravel Pile				
	7/16/2001	Covered With a Gravel Pile				
	8/1/2001	6.14	NP	-	29.45	NA
	9/19/2001	Covered With a Gravel Pile				
	12/22/2001	3.82	NP	-	31.77	NA
	3/15/2002	3.89	NP	-	31.70	NA
	6/4/2002	5.13	NP	-	30.46	NA
	9/23/2002	6.69	NP	-	28.90	NA
	12/19/2002	5.53	NP	-	30.06	NA
	3/19/2003	3.99	NP	-	31.60	NA
	6/24/2003	5.15	NP	-	30.44	NA
	9/24/2003	6.67	NP	-	28.92	NA
	12/26/2003	4.48	NP	-	31.11	NA
	3/30/2004	4.76	NP	-	30.83	NA
	6/24/2004	5.94	NP	-	29.65	NA
	9/27/2004	6.28	NP	-	29.31	NA
<b>CR-13</b> (35.46)	6/9/1999	5.08	NP	-	30.38	NA
	7/8/1999	5.27	NP	-	30.19	NA
	8/16/1999	5.77	NP	-	29.69	NA
	9/20/1999	9.05	NP	-	26.41	NA
	2/9/2000	3.86	NP	-	31.60	NA
	5/9/2000	4.63	NP	-	30.83	NA
	5/15/2000	4.37	NP	-	31.09	NA
	7/11/2000	5.28	NP	-	30.18	NA
	8/14/2000	5.81	NP	-	29.65	NA
	12/12/2000	5.64	NP	-	29.82	NA
	4/3/2001	5.80	NP	-	29.66	NA
	6/8/2001	5.75	NP	-	29.71	NA
	7/16/2001	6.29	NP	-	29.17	NA
	8/1/2001	6.52	NP	-	28.94	NA
	9/19/2001	Covered With a Gravel Pile				
	12/22/2001	4.34	NP	-	31.12	NA
	3/15/2002	4.38	NP	-	31.08	NA
	6/4/2002	5.66	NP	-	29.80	NA
	9/23/2002	6.83	NP	-	28.63	NA
	12/19/2002	6.09	NP	-	29.37	NA
	3/19/2003	4.71	NP	-	30.75	NA
	6/24/2003	5.66	NP	-	29.80	NA
	9/24/2003	6.90	NP	-	28.56	NA
	12/26/2003	4.93	NP	-	30.53	NA
	3/30/2004	5.29	NP	-	30.17	NA
	6/24/2004	6.24	NP	-	29.22	NA
	9/27/2004	6.49	NP	-	28.97	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-14</b>	6/9/1999	5.03	NP	-	30.40	NA
(35.43)	7/8/1999	5.27	NP	-	30.16	NA
	8/16/1999	5.85	NP	-	29.58	NA
	9/20/1999	6.14	NP	-	29.29	NA
	2/9/2000	3.98	NP	-	31.45	NA
	5/9/2000	4.66	NP	-	30.77	NA
	5/15/2000	4.33	NP	-	31.10	NA
	7/11/2000	5.41	NP	-	30.02	NA
	8/14/2000	6.01	NP	-	29.42	NA
	12/12/2000	5.87	NP	-	29.56	NA
	4/3/2001	5.70	NP	-	29.73	NA
	6/8/2001	5.81	NP	-	29.62	NA
	7/16/2001	6.20	NP	-	29.23	NA
	8/1/2001	6.32	NP	-	29.11	NA
	9/19/2001	6.99	NP	-	28.44	NA
	12/20/2001	4.22	NP	-	31.21	NA
	3/15/2002	4.09	NP	-	31.34	NA
	6/4/2002	5.41	NP	-	30.02	NA
	9/23/2002	6.86	NP	-	28.57	NA
	12/19/2002	5.59	NP	-	29.84	NA
	3/19/2003	4.54	NP	-	30.89	NA
	6/24/2003	5.51	NP	-	29.92	NA
	9/24/2003	7.01	NP	-	28.42	NA
	12/26/2003	4.72	NP	-	30.71	NA
	3/30/2004	5.38	NP	-	30.05	NA
	6/24/2004	6.36	NP	-	29.07	NA
	9/27/2004	6.53	NP	-	28.90	NA
<b>CR-15</b>	6/9/1999	9.06	NP	-	26.36	NA
(35.42)	7/8/1999	9.44	9.41	0.03	26.00	NR ***
	8/16/1999	10.35	10.08	0.27	25.29	NR ***
	9/20/1999	11.07	10.63	0.44	24.70	NR ***
	2/9/2000	8.32	8.01	0.31	27.35	NR ***
	5/9/2000	8.91	8.66	0.25	26.71	NR ***
	5/15/2000	8.74	8.53	0.21	26.85	NR ***
	5/16/2000	8.60	8.45	0.15	26.94	NR ***
	6/7/2000	9.33	8.99	0.34	26.36	NR ***
	7/11/2000	10.02	9.70	0.32	25.66	NR ***
	8/14/2000	10.76	10.39	0.37	24.96	NR ***
	12/12/2000	10.60	10.56	0.04	24.85	NR ***
	4/3/2001	10.17	10.05	0.12	25.35	NR ***
	6/8/2001	10.56	10.37	0.19	25.01	NR ***
	7/16/2001	10.97	10.77	0.20	24.61	NR ***
	9/19/2001	12.17	11.76	0.41	23.58	NR ***
	12/22/2001	8.66	8.50	0.16	26.89	NR ***
	3/15/2002	8.86	8.42	0.44	26.91	0.3
	6/4/2002	10.52	10.25	0.27	25.12	0.5
	9/23/2002	11.40	11.31	0.09	24.09	0.13
	12/19/2002	9.39	9.37	0.02	26.05	0.03
	3/19/2003	9.11	9.04	0.07	26.37	0.13
	6/24/2003	10.63	10.52	0.11	24.88	0.01
	9/24/2003	12.53	12.32	0.21	23.06	0.01
	12/26/2003	10.34	9.78	0.56	25.53	NA
	3/30/2004	10.34	9.92	0.42	25.42	NA
	6/24/2004	11.26	11.11	0.15	24.28	NA
	9/27/2004	11.85	11.76	0.09	23.64	NA



**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-16</b> (34.77)	6/9/1999	11.05	NP	-	23.72	NA
	7/8/1999	11.61	NP	-	23.16	NA
	8/16/1999	11.82	NP	-	22.95	NA
	9/20/1999	12.00	NP	-	22.77	NA
	2/9/2000	10.39	NP	-	24.38	NA
	5/9/2000	11.10	NP	-	23.67	NA
	5/15/2000	11.12	NP	-	23.65	NA
	7/11/2000	11.86	NP	-	22.91	NA
	8/14/2000	11.96	NP	-	22.81	NA
	12/12/2000	11.95	NP	-	22.82	NA
	4/3/2001	11.93	NP	-	22.84	NA
	6/8/2001	NM	NM	-	NM	-
	7/16/2001	12.06	NP	-	22.71	NA
	9/19/2001	12.60	NP	-	22.17	NA
	12/22/2001	10.40	NP	-	24.37	NA
	3/15/2002	10.64	NP	-	24.13	NA
	6/4/2002	11.89	NP	-	22.88	NA
	9/23/2002	12.16	NP	-	22.61	NA
	12/19/2002	10.89	10.87	0.02	23.90	0.01
	3/19/2003	10.54	NP	-	24.23	NA
	6/24/2003	11.81	NP	-	22.96	NA
	9/24/2003	12.42	NP	-	22.35	NA
	12/26/2003	11.29	NP	-	23.48	NA
	3/30/2004	10.83	NP	-	23.94	NA
	6/24/2004	12.04	12.02	0.02	22.75	NA
	9/27/2004	12.03	NP	-	22.74	NA
<b>CR-17</b> (34.46)	6/9/1999	6.90	NP	-	27.56	NA
	7/8/1999	7.15	NP	-	27.31	NA
	8/16/1999	7.81	NP	-	26.65	NA
	9/20/1999	8.35	NP	-	26.11	NA
	2/9/2000	6.41	NP	-	28.05	NA
	5/9/2000	6.80	NP	-	27.66	NA
	5/15/2000	6.68	NP	-	27.78	NA
	7/11/2000	7.50	NP	-	26.96	NA
	8/14/2000	8.21	NP	-	26.25	NA
	12/12/2000	8.26	NP	-	26.20	NA
	4/3/2001	7.90	NP	-	26.56	NA
	6/8/2001	NM	NM	-	NM	-
	7/16/2001	8.59	NP	-	25.87	NA
	9/19/2001	9.70	NP	-	24.76	NA
	12/22/2001	6.57	NP	-	27.89	NA
	3/15/2002	6.47	NP	-	27.99	NA
	6/4/2002	7.82	NP	-	26.64	NA
	9/23/2002	8.81	NP	-	25.65	NA
	12/19/2002	7.92	NP	-	26.54	NA
	3/19/2003	6.70	NP	-	27.76	NA
	6/24/2003	7.96	NP	-	26.50	NA
	9/24/2003	9.63	NP	-	24.83	NA
	12/26/2003	7.51	7.10	0.41	27.28	NA
	3/30/2004	7.32	NP	-	27.14	NA
	6/24/2004	8.65	NP	-	25.81	NA
	9/27/2004	8.32	NP	-	26.14	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-18</b> (34.84)	6/9/1999	3.77	NP	-	31.07	NA
	7/8/1999	4.14	NP	-	30.70	NA
	8/16/1999	5.19	NP	-	29.65	NA
	9/20/1999	NM	NM	-	NM	-
	2/9/2000	NM	NM	-	NM	-
	5/9/2000	NM	NM	-	NM	-
	5/15/2000	NM	NM	-	NM	-
	7/11/2000	NM	NM	-	NM	-
	8/14/2000	NM	NM	-	NM	-
	12/12/2000	NM	NM	-	NM	-
	4/3/2001	NM	NM	-	NM	-
	6/8/2001	NM	NM	-	NM	-
	7/16/2001	NM	NM	-	NM	-
	9/19/2001	NM	NM	-	NM	-
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	NM	NM	-	NM	-
	6/4/2002	NM	NM	-	NM	-
	9/23/2002	NM	NM	-	NM	-
	12/19/2002	NM	NM	-	NM	-
	3/19/2003	NM	NM	-	NM	-
	6/24/2003	NM	NM	-	NM	-
	9/24/2003	NM	NM	-	NM	-
	12/26/2003	NM	NM	-	NM	-
	3/30/2004	NM	NM	-	NM	-
	6/24/2004	NM	NM	-	NM	-
	9/27/2004	NM	NM	-	NM	-
<b>CR-19</b> (35.49)	6/9/1999	5.10	NP	-	30.39	NA
	7/8/1999	6.24	5.27	0.97	30.03	NR ***
	8/16/1999	7.65	5.87	1.78	29.26	NR ***
	9/20/1999	8.86	6.38	2.48	28.61	NR ***
	2/9/2000	5.94	3.35	2.59	31.62	NR ***
	5/9/2000	6.19	4.38	1.81	30.75	NR ***
	5/15/2000	4.27	4.22	0.05	31.26	NR ***
	5/16/2000	4.32	4.26	0.06	31.22	NR ***
	6/7/2000	5.57	4.78	0.79	30.55	NR ***
	7/11/2000	6.17	5.35	0.82	29.98	NR ***
	8/14/2000	7.50	5.94	1.56	29.24	NR ***
	12/12/2000	8.69	5.90	2.79	29.03	NR ***
	4/3/2001	8.03	5.61	2.42	29.40	NR ***
	6/8/2001	7.77	5.75	2.02	29.34	NR ***
	7/16/2001	7.99	6.32	1.67	28.84	NR ***
	9/19/2001	8.86	7.14	1.72	28.01	NR ***
	12/22/2001	4.62	4.24	0.38	31.17	NR ***
	3/15/2002	4.47	4.13	0.34	31.29	0.25
	6/4/2002	6.92	5.39	1.53	29.79	1.50
	9/23/2002	8.48	6.91	1.57	28.27	0.53
	12/19/2002	7.09	6.17	0.92	29.14	0.26
	3/19/2003	4.83	4.40	0.43	31.00	0.26
	6/24/2003	6.51	5.50	1.01	29.79	0.75
	9/24/2003	7.68	6.99	0.69	28.36	0.26
	12/26/2003	7.41	5.21	2.20	29.84	2.50
	3/30/2004	7.12	5.49	1.63	29.67	2.50
	6/24/2004	7.40	6.62	0.78	28.71	2.50
	9/27/2004	8.28	7.65	0.63	27.71	2.50

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-20</b> (35.14)	7/8/1999	7.69	NP	-	27.45	NA
	8/16/1999	8.50	NP	-	26.64	NA
	9/20/1999	9.14	NP	-	26.00	NA
	2/9/2000	6.67	NP	-	28.47	NA
	5/9/2000	7.25	NP	-	27.89	NA
	5/15/2000	6.98	NP	-	28.16	NA
	7/11/2000	8.15	NP	-	26.99	NA
	8/14/2000	8.95	NP	-	26.19	NA
	12/12/2000	9.12	NP	-	26.02	NA
	4/3/2001	8.75	NP	-	26.39	NA
	6/8/2001	9.04	NP	-	26.10	NA
	7/16/2001	9.51	NP	-	25.63	NA
	9/19/2001	10.91	NP	-	24.23	NA
	12/20/2001	6.96	NP	-	28.18	NA
	3/15/2002	6.91	NP	-	28.23	NA
	6/4/2002	8.74	NP	-	26.40	NA
	9/23/2002	10.29	NP	-	24.85	NA
	12/19/2002	8.88	NP	-	26.26	NA
	3/19/2003	7.35	NP	-	27.79	NA
	6/24/2003	9.05	NP	-	26.09	NA
	9/24/2003	11.30	NP	-	23.84	NA
	12/26/2003	8.08	8.06	0.02	27.08	NA
	3/30/2004	8.35	NP	-	26.79	NA
	6/24/2004	9.89	NP	-	25.25	NA
	9/27/2004	9.59	NP	-	25.55	NA
<b>CR-21A</b> (34.11)	12/12/2000	5.54	NP	-	28.57	NA
	4/5/2001	5.21	5.11	0.10	28.98	NR ***
	6/8/2001	5.61	5.11	0.50	28.90	NR ***
	7/16/2001	6.37	5.25	1.12	28.64	NR ***
	9/19/2001	Covered With Construction Equipment				
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	NM	NM	>1.0E	NM	NM
	6/4/2002	NM	4.85E	>1.5E	NM	NM
	9/23/2002	8.10E	6.10E	2.0E	NM	0.04
	12/19/2002	5.19	4.95	0.24	29.11	0.02
	3/19/2003	3.6E	3.4E	0.2E	NM	0.01
	6/24/2003	5.6E	5.33	0.25E	NM	0.01
	9/24/2003	7.1E	6.80	0.3E	NM	0.01
	12/26/2003	3.75	3.63E	0.12E	NM	0.01
	3/30/2004	5.35	4.99	0.36	29.05	0.25
	6/24/2004	6.52	6.17	0.35	27.87	NA
	9/27/2004	7.09	6.59	0.50	27.42	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-21B</b>	12/12/2000	6.53	NP	-	27.83	NA
(34.36)	4/3/2001	5.62	NP	-	28.74	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	6.88	NP	-	27.48	NA
	9/19/2001	7.41	NP	-	26.95	NA
	12/20/2001	4.68	NP	-	29.68	NA
	3/15/2002	4.48	NP	-	29.88	NA
	6/4/2002	5.59	NP	-	28.77	NA
	9/23/2002	7.77	NP	-	26.59	NA
	12/19/2002	5.79	NP	-	28.57	NA
	3/19/2003	4.92	NP	-	29.44	NA
	6/24/2003	6.21	NP	-	28.15	NA
	9/24/2003	7.77	NP	-	26.59	NA
	12/26/2003	4.41	NP	-	29.95	NA
	3/30/2004	5.30	NP	-	29.06	NA
	6/24/2004	6.67	NP	-	27.69	NA
	9/27/2004	6.99	NP	-	27.37	NA
<b>CR-22A</b>	12/12/2000	11.92	NP	-	22.88	NA
(34.80)	4/3/2001	11.51	NP	-	23.29	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	11.89	NP	-	22.91	NA
	9/19/2001	12.52	NP	-	22.28	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	10.36	NP	-	24.44	NA
	6/4/2002	11.32	NP	-	23.48	NA
	9/23/2002	12.12	NP	-	22.68	NA
	12/19/2002	11.93	NP	-	22.87	NA
	3/19/2003	10.99	NP	-	23.81	NA
	6/24/2003	11.83	NP	-	22.97	NA
	9/24/2003	12.96	NP	-	21.84	NA
	12/26/2003	11.65	NP	-	23.15	NA
	3/30/2004	11.79	NP	-	23.01	NA
	6/24/2004	12.28	NP	-	22.52	NA
	9/27/2004	12.33	NP	-	22.47	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-22B</b>	12/12/2000	11.27	NP	-	23.92	NA
(35.19)	4/3/2001	10.70	NP	-	24.49	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	11.31	NP	-	23.88	NA
	9/19/2001	12.02	NP	-	23.17	NA
	12/20/2001	9.63	NP	-	25.56	NA
	3/15/2002	9.52	NP	-	25.67	NA
	6/4/2002	10.59	NP	-	24.60	NA
	9/23/2002	11.57	NP	-	23.62	NA
	12/19/2002	11.39	NP	-	23.80	NA
	3/19/2003	10.02	NP	-	25.17	NA
	6/24/2003	10.52	NP	-	24.67	NA
	9/24/2003	12.24	NP	-	22.95	NA
	12/26/2003	10.64	NP	-	24.55	NA
	3/30/2004	10.33	NP	-	24.86	NA
	6/24/2004	11.26	NP	-	23.93	NA
	9/27/2004	11.25	NP	-	23.94	NA
<b>CR-23A</b>	12/12/2000	13.56	NP	-	22.79	NA
(36.35)	4/3/2001	13.20	NP	-	23.15	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	13.52	NP	-	22.83	NA
	9/19/2001	14.19	NP	-	22.16	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	11.84	NP	-	24.51	NA
	6/4/2002	12.83	NP	-	23.52	NA
	9/23/2002	13.66	NP	-	22.69	NA
	12/19/2002	13.66	NP	-	22.69	NA
	3/19/2003	11.97	NP	-	24.38	NA
	6/24/2003	12.64	NP	-	23.71	NA
	9/24/2003	13.95	NP	-	22.40	NA
	12/26/2003	12.70	NP	-	23.65	NA
	3/30/2004	12.47	NP	-	23.88	NA
	6/24/2004	13.46	NP	-	22.89	NA
	9/27/2004	13.45	NP	-	22.90	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-23B</b>	12/12/2000	12.57	NP	-	23.70	NA
(36.27)	4/3/2001	12.18	NP	-	24.09	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	12.71	NP	-	23.56	NA
	9/19/2001	13.79	NP	-	22.48	NA
	12/20/2001	11.04	NP	-	25.23	NA
	3/15/2002	10.94	NP	-	25.33	NA
	6/4/2002	12.96	NP	-	23.31	NA
	9/23/2002	12.79	NP	-	23.48	NA
	12/19/2002	12.79	NP	-	23.48	NA
	3/19/2003	12.55	NP	-	23.72	NA
	6/24/2003	12.65	NP	-	23.62	NA
	9/24/2003	13.57	NP	-	22.70	NA
	12/26/2003	11.85	NP	-	24.42	NA
	3/30/2004	11.46	NP	-	24.81	NA
	6/24/2004	12.73	NP	-	23.54	NA
	9/27/2004	12.62	NP	-	23.65	NA
<b>CR-24A</b>	12/12/2000	15.15	NP	-	21.06	NA
(36.21)	4/3/2001	14.46	NP	-	21.75	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	14.64	NP	-	21.57	NA
	9/19/2001	15.11	NP	-	21.10	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	13.29	NP	-	22.92	NA
	6/4/2002	14.07	NP	-	22.14	NA
	9/23/2002	14.82	NP	-	21.39	NA
	12/19/2002	14.72	NP	-	21.49	NA
	3/19/2003	13.53	NP	-	22.68	NA
	6/24/2003	14.04	NP	-	22.17	NA
	9/24/2003	14.88	NP	-	21.33	NA
	12/26/2003	14.17	NP	-	22.04	NA
	3/30/2004	12.61	NP	-	23.60	NA
	6/24/2004	14.45	NP	-	21.76	NA
	9/27/2004	14.65	NP	-	21.56	NA
<b>CR-24B</b>	12/12/2000	13.78	NP	-	22.54	NA
(36.32)	4/3/2001	13.40	NP	-	22.92	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	13.77	NP	-	22.55	NA
	9/19/2001	14.44	NP	-	21.88	NA
	12/20/2001	12.41	NP	-	23.91	NA
	3/15/2002	12.06	NP	-	24.26	NA
	6/4/2002	12.94	NP	-	23.38	NA
	9/23/2002	13.42	NP	-	22.90	NA
	12/19/2002	13.78	NP	-	22.54	NA
	3/19/2003	12.52	NP	-	23.80	NA
	6/24/2003	13.06	NP	-	23.26	NA
	9/24/2003	14.32	NP	-	22.00	NA
	12/26/2003	12.97	NP	-	23.35	NA
	3/30/2004	13.52	NP	-	22.80	NA
	6/24/2004	13.58	NP	-	22.74	NA
	9/27/2004	13.61	NP	-	22.71	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>CR-25</b>	12/12/2000	8.23	NP	-	26.04	NA
(34.27)	4/3/2001	7.69	7.25	0.44	26.93	NR ***
	6/8/2001	7.49	7.15	0.34	27.05	NR ***
	7/16/2001	8.67	7.73	0.94	26.35	NR ***
	9/19/2001	9.02	8.75	0.27	25.47	NR ***
	12/20/2001	6.96	6.81	0.15	27.43	NR ***
	3/15/2002	6.66	6.51	0.15	27.73	0.1
	6/4/2002	7.83	7.62	0.21	26.61	0.25
	9/23/2002	9.02	8.79	0.23	25.43	0.13
	12/19/2002	8.48	8.34	0.14	25.90	0.05
	3/19/2003	6.91	6.74	0.17	27.50	0.2
	6/24/2003	7.79	7.58	0.21	26.65	NR
	9/24/2003	9.06	8.91	0.15	25.33	NR
	12/26/2003	7.51	7.35	0.16	26.89	NR
	3/30/2004	8.00	7.79	0.21	26.44	0.0
	6/24/2004	8.65	8.19	0.46	25.99	0.0
	9/27/2004	8.65	8.42	0.23	25.80	0.0
<b>GPW-1</b>	12/12/2000	12.99	NP	-	21.67	NA
(34.66)	2/20/2001	12.59	NP	-	22.07	NA
	4/3/2001	12.56	NP	-	22.10	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	12.70	NP	-	21.96	NA
	9/19/2001	13.15	NP	-	21.51	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	7.46	NP	-	27.20	NA
	6/4/2002	11.71	NP	-	22.95	NA
	9/23/2002	12.95	NP	-	21.71	NA
	12/19/2002	12.71	NP	-	21.95	NA
	3/19/2003	7.19	NP	-	27.47	NA
	6/24/2003	10.06	NP	-	24.60	NA
	9/24/2003	13.07	NP	-	21.59	NA
	12/26/2003	11.01	NP	-	23.65	NA
	3/30/2004	7.61	NP	-	27.05	NA
	6/24/2004	12.36	NP	-	22.30	NA
	9/27/2004	12.99	NP	-	21.67	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>GPW-2</b>	12/12/2000	NM	NM	NM	NM	-
(34.98)	2/20/2001	10.93	10.68	-	24.05	NA
	4/3/2001	NM	NM	NM	NM	-
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	NM	NM	NM	NM	-
	9/19/2001	12.91	NP	-	22.07	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	7.91	NP	-	27.07	NA
	6/4/2002	NM	NM	1.2E	NM	0.01
	9/23/2002	13.10E	12.97E	0.13E	E	0.05
	12/19/2002	12.32	-	-	-	-
	3/19/2003	9.4E	-	-	-	0.02
	6/24/2003	10.20	NM	Sheen	24.78	NA
	9/24/2003	12.18	11.93	0.25E	23.00	0.01
	12/26/2003	10.80	10.55	0.25	24.38	0.25
	3/30/2004	9.31	8.92	0.39	25.98	0.25
	6/24/2004	10.75	10.73	0.02	24.25	NA
	9/27/2004	12.55	11.83	0.72	23.01	NA
<b>GPW-3</b>	12/12/2000	12.23	NP	-	22.85	NA
(35.08)	2/20/2001	12.03	NP	-	23.05	NA
	4/3/2001	11.97	NP	-	23.11	NA
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	12.16	NP	-	22.92	NA
	9/19/2001	12.66	NP	-	22.42	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	10.46	NP	-	24.62	NA
	6/4/2002	11.22	NP	-	23.86	NA
	9/23/2002	11.72	NP	-	23.36	NA
	12/19/2002	12.20	-	-	-	0.01
	3/19/2003	10.86E	-	-	-	0.01
	6/24/2003	11.35E	11.24	0.11E	23.82E	0.01
	9/24/2003	11.90	11.78	0.12E	23.40E	0.01
	12/26/2003	13.49	11.24	2.25E	21.59	0.25
	3/30/2004	11.73	10.90	0.83E	23.35	0.03
	6/24/2004	11.83	11.59	0.24	23.34	NA
	9/27/2004	12.32	11.86	0.46	22.32	NA



**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>GPW-4</b>	12/12/2000	NM	NM	NM	NM	-
(35.07)	2/20/2001	12.29	NP	-	22.78	NA
	4/3/2001	NM	NM	NM	NM	-
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	NM	NM	NM	NM	-
	9/19/2001	13.02	NP	-	22.05	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	11.08	NP	-	23.99	NA
	6/4/2002	11.98	NP	-	23.09	-
	9/23/2002	12.71	NP	-	22.36	NA
	12/19/2002	12.23	NP	-	22.84	NA
	3/19/2003	11.30	NP	-	23.77	NA
	6/24/2003	12.12	NP	-	22.95	NA
	9/24/2003	13.11	13.07	0.04	21.99	Trace
	12/26/2003	12.10	NP	-	22.97	NA
	3/30/2004	12.34	11.78	0.56	23.18	NA
	6/24/2004	12.57	NP	-	22.50	NA
	9/27/2004	12.58	NP	-	22.49	NA
<b>GPW-5</b>	12/12/2000	NM	NM	NM	NM	-
(34.85)	2/20/2001	12.02	NP	-	22.83	NA
	4/3/2001	NM	NM	NM	NM	-
	6/8/2001	NM	NM	NM	NM	-
	7/16/2001	NM	NM	NM	NM	-
	9/19/2001	12.79	NP	-	22.06	NA
	12/22/2001	NM	NM	-	NM	-
	3/15/2002	10.72	NP	-	24.13	NA
	6/4/2002	11.66	NP	-	23.19	NA
	9/23/2002	12.46	NP	-	22.39	NA
	12/19/2002	11.96	NP	-	22.89	NA
	3/19/2003	10.97	NP	-	23.88	NA
	6/24/2003	11.80	NP	-	23.05	NA
	9/24/2003	12.92	NP	-	21.93	NA
	12/26/2003	11.64	NP	-	23.21	NA
	3/30/2004	11.57	NP	-	23.28	NA
	6/24/2004	12.21	NP	-	22.64	NA
	9/27/2004	12.21	NP	-	22.64	NA

**TABLE 1A**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
ChevronTexaco Company - Willbridge Terminal  
Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
EX-1	2/14/2000	15.55	NP	-	18.60	NA
(34.15)	5/22/2000	18.29	NP	-	15.86	NA
	8/22/2000	16.56	NP	-	17.59	NA
	11/27/2000	16.86	NP	-	17.29	NA
	2/20/2001	16.66	NP	-	17.49	NA
	5/15/2001	16.62	NP	-	17.53	NA
	9/19/2001	Covered by Facility Equipment				
	12/22/2001	Covered by Facility Equipment				
	3/15/2002	15.34	NP	-	18.81	NA
	9/23/2002	16.88	NP	-	17.27	NA
	12/19/2002	16.99	NP	-	17.16	NA
	3/19/2003	15.65	NP	-	18.50	NA
	6/24/2003	15.98	NP	-	18.17	NA
	9/24/2003	Could Not Access				
	12/26/2003	Could Not Access				
	3/30/2004	Could Not Access				
	6/24/2004	16.35	NP	-	17.80	NA
	9/27/2004	Could Not Access				
<b>NOTES:</b> Wells B-8 and B-31 were abandoned after first quarter 2000 NP = No measurable product NA = Not Applicable NM = Not Measured NR = None Recovered * = SPH Recovered for latest quarter monitored ** = Well Contains a Sock for Product Recovery *** = Product Recovery Part of Chevron Ethanol Study E = 3/4 inch-diameter well/ SPH thickness estimated with bailer - = No measurable product thickness Groundwater elevations for wells with product thicknesses have been corrected using 0.8 GWE = TOC -(DTW - (0.8 x DTP - DTW)) Where 0.8 = The density of the SPH						

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-1</b>	2/14/2000	3.76	NP	-	31.67	NA
(35.43)	5/22/2000	4.72	NP	-	30.71	NA
	8/23/2000	7.52	NP	-	27.91	NA
	11/28/2000	7.43	NP	-	28.00	NA
	2/21/2001	6.32	NP	-	29.11	NA
	5/15/2001	6.33	NP	-	29.10	NA
	9/19/2001	8.40	NP	-	27.03	NA
	12/19/2001	3.92	NP	-	31.51	NA
	3/13/2002	3.80	NP	-	31.63	NA
	6/24/2002	6.56	NP	-	28.87	NA
	9/26/2002	8.15	NP	-	27.28	NA
	12/20/2002	5.32	NP	-	30.11	NA
	3/17/2003	3.81	NP	-	31.62	NA
	6/26/2003	6.19	NP	-	29.24	NA
	9/24/2003	8.04	NP	-	27.39	NA
	12/30/2003	4.02	NP	-	31.41	NA
	3/29/2004	4.45	NP	-	30.98	NA
	6/29/2004	6.84	NP	-	28.59	NA
	9/27/2004	7.32	NP	-	28.11	NA
<b>MW-2</b>	2/14/2000	5.59	NP	-	30.18	NA
(35.77)	5/22/2000	6.74	NP	-	29.03	NA
	8/23/2000	8.44	NP	-	27.33	NA
	11/28/2000	9.15	NP	-	26.62	NA
	2/21/2001	8.29	NP	-	27.48	NA
	5/15/2001	8.11	NP	-	27.66	NA
	9/19/2001	9.93	NP	-	25.84	NA
	12/19/2001	6.02	NP	-	29.75	NA
	3/13/2002	5.51	NP	-	30.26	NA
	6/24/2002	7.67	NP	-	28.10	NA
	9/26/2002	9.41	NP	-	26.36	NA
	12/20/2002	9.32	NP	-	26.45	NA
	3/17/2003	5.85	NP	-	29.92	NA
	6/26/2003	7.34	NP	-	28.43	NA
	9/24/2003	9.33	NP	-	26.44	NA
	12/30/2003	6.79	NP	-	28.98	NA
	3/29/2004	6.35	NP	-	29.42	NA
	6/29/2004	8.11	NP	-	27.66	NA
	9/27/2004	9.13	NP	-	26.64	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-3</b> (36.02)	2/14/2000	7.02	NP	-	29.00	NA
	5/22/2000	8.04	NP	-	27.98	NA
	8/23/2000	9.58	NP	-	26.44	NA
	11/28/2000	10.22	NP	-	25.80	NA
	2/21/2001	9.49	NP	-	26.53	NA
	5/15/2001	9.33	NP	-	26.69	NA
	9/19/2001	10.96	NP	-	25.06	NA
	12/19/2001	7.55	NP	-	28.47	NA
	3/13/2002	7.10	NP	-	28.92	NA
	6/24/2002	8.93	NP	-	27.09	NA
	9/26/2002	10.47	NP	-	25.55	NA
	12/20/2002	10.63	NP	-	25.39	NA
	3/17/2003	7.29	NP	-	28.73	NA
	6/26/2003	8.65	NP	-	27.37	NA
	9/24/2003	10.38	NP	-	25.64	NA
	12/30/2003	8.21	NP	-	27.81	NA
	3/29/2004	7.69	NP	-	28.33	NA
	6/29/2004	9.34	NP	-	26.68	NA
	9/27/2004	10.28	NP	-	25.74	NA
<b>MW-4</b> (36.39)	2/14/2000	6.36	NP	-	30.03	NA
	5/22/2000	7.54	NP	-	28.85	NA
	8/23/2000	9.18	NP	-	27.21	NA
	11/28/2000	9.83	NP	-	26.56	NA
	2/21/2001	9.07	NP	-	27.32	NA
	5/15/2001	8.93	NP	-	27.46	NA
	9/19/2001	10.59	NP	-	25.80	NA
	12/19/2001	6.98	NP	-	29.41	NA
	3/13/2002	6.42	NP	-	29.97	NA
	6/24/2002	8.49	NP	-	27.90	NA
	9/26/2002	10.10	NP	-	26.29	NA
	12/20/2002	10.21	NP	-	26.18	NA
	3/17/2003	6.57	NP	-	29.82	NA
	6/26/2003	8.15	NP	-	28.24	NA
	9/24/2003	10.00	NP	-	26.39	NA
	12/30/2003	7.65	NP	-	28.74	NA
	3/29/2004	7.07	NP	-	29.32	NA
	6/29/2004	8.88	NP	-	27.51	NA
	9/27/2004	9.89	NP	-	26.50	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-5</b> (33.52)	2/14/2000	6.02	NP	-	27.50	NA
	5/22/2000	6.64	NP	-	26.88	NA
	8/23/2000	8.28	NP	-	25.24	NA
	11/28/2000	5.79	NP	-	27.73	NA
	2/21/2001	8.27	NP	-	25.25	NA
	5/15/2001	6.02	sheen	-	27.50	NA
	9/18/2001	9.77	NP	-	23.75	NA
	12/19/2001	6.39	NP	-	27.13	NA
	3/13/2002	6.09	NP	-	27.43	NA
	6/24/2002	7.24	NP	-	26.28	NA
	9/26/2002	9.30	NP	-	24.22	NA
	12/20/2002	8.21	NP	-	25.31	NA
	3/17/2003	5.85	NP	-	27.67	NA
	6/26/2003	7.22	NP	-	26.30	NA
	9/24/2003	9.19	NP	-	24.33	NA
	12/30/2003	7.00	NP	-	26.52	NA
	3/29/2004	6.30	NP	-	27.22	NA
	6/29/2004	8.11	NP	-	25.41	NA
	9/27/2004	9.11	NP	-	24.41	NA
<b>MW-6</b> (33.34)	2/14/2000	3.72	3.69	0.03	29.64	2.0
	5/22/2000	4.70	NP	-	28.64	NA
	8/23/2000	6.24	NP	-	27.10	NA
	11/28/2000	6.98	NP	-	26.36	0.1
	2/21/2001	6.21	sheen	-	27.13	NA
	5/15/2001	8.10	NP	-	25.24	NA
	9/18/2001	7.71	7.66	0.05	25.67	NA
	12/19/2001	4.05	NP	-	29.29	0.06
	3/13/2002	3.70	sheen	-	29.64	NA
	6/24/2002	5.56	NP	-	27.78	NA
	9/26/2002	7.19	NP	-	26.15	NA
	12/20/2002	7.32	sheen	-	26.02	NA
	3/17/2003	3.87	NP	-	29.47	NA
	6/26/2003	5.20	NP	-	28.14	NA
	9/24/2003	7.09	NP	-	26.25	NA
	12/30/2003	4.80	NP	-	28.54	NA
	3/29/2004	4.29	NP	-	29.05	NA
	6/29/2004	5.23	NP	-	28.11	NA
	9/27/2004	6.98	NP	-	26.36	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**

Kinder Morgan - Willbridge Terminal  
Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-7</b>	2/14/2000	8.74	8.54	0.20	25.54	3.7
(34.12)	5/22/2000	9.95	8.92	1.03	24.99	11
	8/23/2000	NM	NM	-	NA	2
	11/28/2000	10.94	10.35	0.59	23.65	2.2
	2/21/2001	10.37	10.01	0.36	24.04	1.9
	5/15/2001	10.27	10.00	0.27	24.07	1.75
	9/19/2001	11.04	11.00	0.04	23.11	0.8
	12/19/2001	9.05	8.78	0.27	25.29	1.1
	3/13/2002	9.11	8.30	0.81	25.66	4.5
	6/24/2002	10.38	9.48	0.90	24.46	3.3
	9/26/2002	11.32	10.53	0.79	23.43	2.65
	12/23/2002	11.05	10.82	0.23	23.25	1.10
	3/17/2003	9.18	8.45	0.73	25.52	1.55
	6/26/2003	10.03	9.28	0.75	24.69	1.25
	9/24/2003	11.17	10.46	0.71	23.52	1.00
	12/30/2003	9.83	9.47	0.36	24.58	1.00
	3/29/2004	9.35	8.62	0.73	25.35	1.00
	6/29/2004	10.36	9.80	0.56	24.21	
	9/27/2004	10.97	10.61	0.36	23.44	0.20
<b>MW-8</b>	2/14/2000	7.18	NP	-	26.77	NA
(33.95)	5/22/2000	8.00	NP	-	25.95	NA
	8/23/2000	9.26	NP	-	24.69	NA
	11/28/2000	9.91	NP	-	24.04	NA
	2/21/2001	9.40	NP	-	24.55	NA
	5/15/2001	9.30	NP	-	24.65	NA
	9/19/2001	10.49	NP	-	23.46	NA
	12/19/2001	8.42	NP	-	25.53	NA
	3/13/2002	7.38	NP	-	26.57	NA
	6/24/2002	8.81	NP	-	25.14	NA
	9/26/2002	10.15	NP	-	23.80	NA
	12/20/2002	10.50	NP	-	23.45	NA
	3/17/2003	7.48	NP	-	26.47	NA
	6/26/2003	8.61	NP	-	25.34	NA
	9/24/2003	10.10	NP	-	23.85	NA
	12/30/2003	8.74	NP	-	25.21	NA
	3/29/2004	8.74	NP	-	25.21	NA
	6/29/2004	9.19	NP	-	24.76	NA
	9/27/2004	10.12	NP	-	23.83	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-9</b>	2/14/2000	9.66	NP	-	26.87	NA
(36.53)	5/22/2000	10.24	NP	-	26.29	NA
	8/23/2000	11.42	NP	-	25.11	NA
	11/28/2000	12.18	NP	-	24.35	NA
	2/21/2001	11.85	NP	-	24.68	NA
	5/15/2001	11.83	NP	-	24.70	NA
	9/19/2001	12.86	NP	-	23.67	NA
	12/19/2001	11.87	NP	-	24.66	NA
	3/13/2002	10.30	NP	-	26.23	NA
	6/24/2002	11.21	NP	-	25.32	NA
	9/26/2002	11.43	NP	-	25.10	NA
	12/23/2002	12.97	NP	-	23.56	NA
	3/17/2003	10.62	NP	-	25.91	NA
	6/26/2003	10.86	NP	-	25.67	NA
	9/24/2003	12.27	NP	-	24.26	NA
	12/30/2003	11.77	NP	-	24.76	NA
	3/29/2004	10.39	NP	-	26.14	NA
	6/29/2004	11.58	NP	-	24.95	NA
	9/27/2004	12.56	NP	-	23.97	NA
<b>MW-10</b>	2/14/2000	8.46	NP	-	27.36	NA
(35.82)	5/22/2000	5.59	NP	-	30.23	NA
	8/23/2000	11.21	NP	-	24.61	NA
	11/28/2000	11.86	NP	-	23.96	NA
	2/21/2001	11.16	NP	-	24.66	NA
	5/15/2001	11.04	NP	-	24.78	NA
	9/19/2001	12.59	NP	-	23.23	NA
	12/19/2001	9.42	NP	-	26.40	NA
	3/13/2002	8.58	NP	-	27.24	NA
	6/24/2002	10.54	NP	-	25.28	NA
	9/26/2002	12.12	NP	-	23.70	NA
	12/23/2002	12.14	NP	-	23.68	NA
	3/17/2003	8.78	NP	-	27.04	NA
	6/26/2003	10.24	NP	-	25.58	NA
	9/24/2003	12.02	NP	-	23.80	NA
	12/30/2003	9.98	NP	-	25.84	NA
	3/29/2004	9.26	NP	-	26.56	NA
	6/29/2004	10.98	NP	-	24.84	NA
	9/27/2004	12.00	NP	-	23.82	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**

Kinder Morgan - Willbridge Terminal  
Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-11</b>	2/14/2000	5.04	NP	-	31.43	NA
(36.47)	5/22/2000	3.11	NP	-	33.36	NA
	8/23/2000	7.97	NP	-	28.50	NA
	11/28/2000	7.66	NP	-	28.81	NA
	2/21/2001	7.48	NP	-	28.99	NA
	5/15/2001	7.30	NP	-	29.17	NA
	9/19/2001	9.29	NP	-	27.18	NA
	12/19/2001	5.44	NP	-	31.03	NA
	3/13/2002	5.23	NP	-	31.24	NA
	6/24/2002	7.71	NP	-	28.76	NA
	9/26/2002	9.01	NP	-	27.46	NA
	12/23/2002	7.07	NP	-	29.40	NA
	3/17/2003	5.72	NP	-	30.75	NA
	6/26/2003	7.55	NP	-	28.92	NA
	9/24/2003	8.89	NP	-	27.58	NA
	12/30/2003	5.77	NP	-	30.70	NA
	3/29/2004	6.17	NP	-	30.30	NA
	6/29/2004	8.10	NP	-	28.37	NA
	9/27/2004	8.54	NP	-	27.93	NA
<b>MW-12</b>	2/14/2000	4.99	NP	-	30.96	NA
(35.95)	5/22/2000	6.57	NP	-	29.38	NA
	8/23/2000	8.65	NP	-	27.30	NA
	11/28/2000	9.16	NP	-	26.79	NA
	2/21/2001	8.32	NP	-	27.63	NA
	5/15/2001	8.16	NP	-	27.79	NA
	9/19/2001	10.17	NP	-	25.78	NA
	12/19/2001	5.54	NP	-	30.41	NA
	3/13/2002	4.85	NP	-	31.10	NA
	6/24/2002	7.75	NP	-	28.20	NA
	9/26/2002	9.68	NP	-	26.27	NA
	12/23/2002	8.75	NP	-	27.20	NA
	3/17/2003	5.25	NP	-	30.70	NA
	6/26/2003	7.35	NP	-	28.60	NA
	9/24/2003	9.57	NP	-	26.38	NA
	12/30/2003	6.28	NP	-	29.67	NA
	3/29/2004	5.99	NP	-	29.96	NA
	6/29/2004	8.28	NP	-	27.67	NA
	9/27/2004	9.32	NP	-	26.63	NA



**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**

Kinder Morgan - Willbridge Terminal  
Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-13</b>	2/14/2000	3.85	NP	-	34.04	NA
(37.89)	5/22/2000	5.03	NP	-	32.86	NA
	8/23/2000	7.00	NP	-	30.89	NA
	11/28/2000	6.59	NP	-	31.30	NA
	2/21/2001	6.26	NP	-	31.63	NA
	5/15/2001	6.03	NP	-	31.86	NA
	9/19/2001	8.55	NP	-	29.34	NA
	12/19/2001	3.77	NP	-	34.12	NA
	3/13/2002	3.72	NP	-	34.17	NA
	6/24/2002	6.56	NP	-	31.33	NA
	9/26/2002	8.16	NP	-	29.73	NA
	12/23/2002	5.71	NP	-	32.18	NA
	3/17/2003	4.13	NP	-	33.76	NA
	6/26/2003	6.39	NP	-	31.50	NA
	9/24/2003	8.27	NP	-	29.62	NA
	12/30/2003	4.00	NP	-	33.89	NA
	3/29/2004	4.80	NP	-	33.09	NA
	6/29/2004	7.00	NP	-	30.89	NA
	9/27/2004	7.45	NP	-	30.44	NA
<b>MW-14</b>	2/14/2000	2.73	NP	-	33.55	NA
(36.28)	5/22/2000	4.50	NP	-	31.78	NA
	8/23/2000	6.55	NP	-	29.73	NA
	11/28/2000	6.36	NP	-	29.92	NA
	2/21/2001	5.65	NP	-	30.63	NA
	5/15/2001	4.67	NP	-	31.61	NA
	9/19/2001	7.71	NP	-	28.57	NA
	12/19/2001	3.10	NP	-	33.18	NA
	3/13/2002	2.84	NP	-	33.44	NA
	6/24/2002	5.90	NP	-	30.38	NA
	9/26/2002	7.45	NP	-	28.83	NA
	12/23/2002	5.39	NP	-	30.89	NA
	3/17/2003	3.17	NP	-	33.11	NA
	6/26/2003	5.54	NP	-	30.74	NA
	9/24/2003	7.47	NP	-	28.81	NA
	12/30/2003	3.52	NP	-	32.76	NA
	3/29/2004	3.92	NP	-	32.36	NA
	6/29/2004	6.38	NP	-	29.90	NA
	9/27/2004	6.82	NP	-	29.46	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-15</b>	2/14/2000	4.09	NP	-	33.41	NA
(37.50)	5/22/2000	5.80	NP	-	31.70	NA
	8/23/2000	9.21	NP	-	28.29	NA
	11/28/2000	8.90	NP	-	28.60	NA
	2/21/2001	7.46	NP	-	30.04	NA
	5/15/2001	7.80	NP	-	29.70	NA
	9/18/2001	10.46	NP	-	27.04	NA
	12/19/2001	4.03	NP	-	33.47	NA
	3/13/2002	4.14	NP	-	33.36	NA
	6/24/2002	7.93	NP	-	29.57	NA
	9/26/2002	10.13	NP	-	27.37	NA
	12/23/2002	5.72	sheen	-	31.78	NA
	3/17/2003	3.62	NP	-	33.88	NA
	6/26/2003	7.25	NP	-	30.25	NA
	9/24/2003	10.02	NP	-	27.48	NA
	12/30/2003	4.07	NP	-	33.43	NA
	3/29/2004	5.09	NP	-	32.41	NA
	6/29/2004	8.50	NP	-	29.00	NA
	9/27/2004	9.01	NP	-	28.49	NA
<b>MW-16</b>	2/14/2000	3.44	NP	-	31.49	NA
(34.93)	5/22/2000	4.98	NP	-	29.95	NA
	8/23/2000	6.99	NP	-	27.94	NA
	11/28/2000	7.51	NP	-	27.42	NA
	2/21/2001	6.60	NP	-	28.33	NA
	5/15/2001	6.51	NP	-	28.42	NA
	9/19/2001	8.48	NP	-	26.45	NA
	12/19/2001	3.99	NP	-	30.94	NA
	3/13/2002	3.35	NP	-	31.58	NA
	6/24/2002	5.11	NP	-	29.82	NA
	9/26/2002	6.02	NP	-	28.91	NA
	12/23/2002	7.09	NP	-	27.84	NA
	3/17/2003	3.63	NP	-	31.30	NA
	6/26/2003	5.60	NP	-	29.33	NA
	9/24/2003	8.95	NP	-	25.98	NA
	12/30/2003	4.71	NP	-	30.22	NA
	3/29/2004	4.37	NP	-	30.56	NA
	6/29/2004	6.54	NP	-	28.39	NA
	9/27/2004	7.63	NP	-	27.30	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**

Kinder Morgan - Willbridge Terminal  
Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-17</b>	2/14/2000	4.22	NP	-	31.83	NA
(36.05)	5/22/2000	4.70	NP	-	31.35	NA
	8/23/2000	5.91	NP	-	30.14	NA
	11/28/2000	5.82	NP	-	30.23	NA
	2/21/2001	5.46	NP	-	30.59	NA
	5/15/2001	5.26	NP	-	30.79	NA
	9/18/2001	6.84	NP	-	29.21	NA
	12/19/2001	4.67	NP	-	31.38	NA
	3/13/2002	4.17	NP	-	31.88	NA
	6/24/2002	5.31	NP	-	30.74	NA
	9/26/2002	6.62	NP	-	29.43	NA
	3/17/2003	4.40	NP	-	31.65	NA
	6/26/2003	5.22	NP	-	30.83	NA
	9/24/2003	6.57	NP	-	29.48	NA
	12/30/2003	4.61	NP	-	31.44	NA
	3/29/2004	4.45	NP	-	31.60	NA
	6/29/2004	5.25	NP	-	30.80	NA
	9/27/2004	5.96	NP	-	30.09	NA
<b>MW-18</b>	2/14/2000	0.87	NP	-	32.89	NA
(33.76)	5/22/2000	2.15	NP	-	31.61	NA
	8/23/2000	3.62	sheen	-	30.14	NA
	11/28/2000	3.55	NP	-	30.21	0.1
	2/21/2001	3.10	NP	-	30.66	0.1
	5/15/2001	2.83	NP	-	30.93	0.1
	9/18/2001	4.68	4.66	0.02	29.10	NA
	12/19/2001	0.25	NP	-	33.51	NA
	3/13/2002	0.97	sheen	-	32.79	NA
	6/24/2002	3.03	NP	-	30.73	NA
	9/26/2002	4.32	NP	-	29.44	NA
	12/20/2002	2.83	NP	-	30.93	NA
	3/17/2003	1.48	NP	-	32.28	NA
	6/26/2003	2.76	NP	-	31.00	NA
	9/24/2003	4.31	NP	-	29.45	NA
	12/30/2003	1.20	NP	-	32.56	NA
	3/29/2004	1.71	NP	-	32.05	NA
	6/29/2004	2.98	NP	-	30.78	NA
	9/27/2004	3.74	NP	-	30.02	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**

Kinder Morgan - Willbridge Terminal  
Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-19</b>	2/14/2000	2.82	NP	-	30.57	NA
(33.39)	5/22/2000	4.62	4.59	0.03	28.79	NA
	8/23/2000	5.89	5.88	0.01	27.51	NA
	11/28/2000	5.91	NP	-	27.48	0.3
	2/21/2001	5.03	sheen	-	28.36	0.1
	5/15/2001	4.09	sheen	-	29.30	NA
	9/18/2001	7.27	7.23	0.04	26.15	NA
	12/19/2001	2.72	NP	-	30.67	NA
	3/13/2002	2.84	sheen	-	30.55	NA
	6/24/2002	4.61	NP	-	28.78	NA
	9/26/2002	6.42	NP	-	26.97	NA
	12/20/2002	5.06	NP	-	28.33	NA
	3/17/2003	2.59	NP	-	30.80	NA
	6/26/2003	3.42	NP	-	29.97	NA
	9/24/2003	6.51	6.48	0.03	26.90	0.2
	12/30/2003	2.84	NP	-	30.55	NA
	3/29/2004	3.32	NP	-	30.07	NA
	6/29/2004	5.34	Sheen	-	28.05	NA
	9/27/2004	6.04	Sheen	-	27.35	NA
<b>MW-20</b>	2/14/2000	9.80	NP	-	24.96	NA
(34.76)	5/22/2000	10.23	NP	-	24.53	NA
	8/23/2000	11.47	NP	-	23.29	NA
	11/28/2000	11.45	NP	-	23.31	NA
	2/21/2001	11.21	NP	-	23.55	NA
	5/15/2001	11.20	NP	-	23.56	NA
	9/18/2001	12.48	NP	-	22.28	NA
	12/19/2001	10.21	NP	-	24.55	NA
	3/13/2002	9.80	NP	-	24.96	NA
	6/24/2002	10.71	NP	-	24.05	NA
	9/26/2002	12.11	NP	-	22.65	NA
	12/20/2002	11.91	NP	-	22.85	NA
	3/17/2003	9.80	NP	-	24.96	NA
	6/26/2003	10.83	NP	-	23.93	NA
	9/24/2003	12.12	NP	-	22.64	NA
	12/30/2003	10.61	NP	-	24.15	NA
	3/29/2004	10.27	NP	-	24.49	NA
	6/29/2004	11.31	NP	-	23.45	NA
	9/27/2004	11.94	NP	-	22.82	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-21</b>	2/14/2000	1.26	NP	-	33.07	NA
(34.33)	5/22/2000	1.62	NP	-	32.71	NA
	8/23/2000	2.38	NP	-	31.95	NA
	11/28/2000	1.80	NP	-	32.53	NA
	2/21/2001	1.64	NP	-	32.69	NA
	5/15/2001	1.59	NP	-	32.74	NA
	9/18/2001	3.01	NP	-	31.32	NA
	12/19/2001	0.27	NP	-	34.06	NA
	3/13/2002	0.99	NP	-	33.34	NA
	6/24/2002	1.95	NP	-	32.38	NA
	9/26/2002	3.65	NP	-	30.68	NA
	12/20/2002	2.05	NP	-	32.28	NA
	3/17/2003	Unable to Locate				
	6/26/2003	Unable to Access, Covered by Steel Plate				
	9/24/2003	Unable to Access, Covered by Steel Plate				
	12/30/2003	Unable to Access, Covered by Steel Plate				
	3/29/2004	Unable to Access, Covered by Gravel Pile				
	6/29/2004	Unable to Access, Covered by Gravel Pile				
	9/27/2004	Unable to Access, Covered by Gravel Pile				
<b>MW-22</b>	2/14/2000	2.85	NP	-	32.80	NA
(35.65)	5/22/2000	4.28	NP	-	31.37	NA
	8/23/2000	5.52	NP	-	30.13	NA
	11/28/2000	6.50	NP	-	29.15	NA
	2/21/2001	5.57	sheen	-	30.08	NA
	5/15/2001	5.29	5.28	0.01	30.37	NA
	9/19/2001	6.53	NP	-	29.12	NA
	12/19/2001	3.56	NP	-	32.09	NA
	3/13/2002	3.10	sheen	-	32.55	NA
	6/24/2002	4.89	4.88	0.01	30.77	NA
	9/26/2002	6.14	6.13	0.01	29.52	NA
	12/20/2002	6.29	NP	-	29.36	NA
	3/17/2003	3.81	sheen	-	31.84	0.01
	6/26/2003	4.56	NP	-	31.09	NA
	9/24/2003	6.00	NP	-	29.65	NA
	12/30/2003	4.60	NP	-	31.05	NA
	3/29/2004	4.09	4.08	0.01	31.56	NA
	6/29/2004	5.48	NP	-	30.17	NA
	9/27/2004	5.79	Sheen	-	29.86	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**

Kinder Morgan - Willbridge Terminal  
Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-23</b>	2/14/2000	3.56	NP	-	32.50	NA
(36.06)	5/22/2000	5.63	NP	-	30.43	NA
	8/23/2000	5.82	5.82	0.00	30.24	NA
	11/28/2000	5.51	5.51	0.00	30.55	0.1
	2/21/2001	5.33	NP	-	30.73	0.1
	5/15/2001	5.01	sheen	-	31.05	NA
	9/19/2001	6.50	6.49	0.01	29.57	NA
	12/19/2001	4.19	NP	-	31.87	NA
	3/13/2002	3.99	NP	-	32.07	NA
	6/24/2002	5.44	NP	-	30.62	NA
	9/26/2002	8.21	sheen	-	27.85	NA
	12/20/2002	5.20	NP	-	30.86	NA
	3/17/2003	4.47	NP	-	31.59	NA
	6/26/2003	5.54	NP	-	30.52	NA
	9/24/2003	6.35	sheen	-	29.71	0.1
	12/30/2003	4.41	NP	-	31.65	NA
	3/29/2004	4.48	NP	-	31.58	NA
	6/29/2004	6.58	sheen	-	29.48	NA
	9/27/2004	5.91	sheen	-	30.15	NA
<b>MW-24</b>	2/14/2000	5.00	4.50	0.50	30.55	1.0
(35.15)	5/22/2000	5.34	5.21	0.13	29.91	2.0
	8/23/2000	8.56	NP	-	26.59	NA
	11/28/2000	7.79	NP	-	27.36	0.3
	2/21/2001	7.20	7.15	0.05	27.99	0.4
	5/15/2001	5.45	sheen	-	29.70	0.1
	9/19/2001	9.55	9.54	0.01	25.61	NA
	12/19/2001	5.30	4.84	0.46	30.22	0.1
	3/13/2002	6.78	sheen	-	28.37	0.16
	6/24/2002	6.80	6.79	0.01	28.36	0.2
	9/26/2002	8.86	sheen	-	26.29	0.01
	12/20/2002	6.34	6.35	0.01	28.82	NA
	3/17/2003	4.78	4.70	0.08	30.43	0.1
	6/26/2003	6.51	sheen	-	28.64	0.02
	9/24/2003	8.35	NP	-	26.80	NA
	12/30/2003	4.80	4.60	0.2*	30.35	0.10
	3/29/2004	5.35	5.33	0.02*	29.80	NA
	6/29/2004	6.82	6.81	0.01	28.34	NA
	9/27/2004	8.58	8.56	0.02	26.59	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-25</b>	2/14/2000	10.03	NP	-	24.70	NA
(34.73)	5/22/2000	11.66	NP	-	23.07	NA
	8/23/2000	12.20	NP	-	22.53	NA
	11/28/2000	12.34	NP	-	22.39	NA
	2/21/2001	11.97	NP	-	22.76	NA
	5/15/2001	11.91	NP	-	22.82	NA
	9/19/2001	13.12	NP	-	21.61	NA
	12/19/2001	10.45	NP	-	24.28	NA
	3/13/2002	10.35	NP	-	24.38	NA
	6/24/2002	11.38	NP	-	23.35	NA
	9/26/2002	12.77	NP	-	21.96	NA
	12/20/2002	12.14	NP	-	22.59	NA
	3/17/2003	10.38	NP	-	24.35	NA
	6/26/2003	11.60	NP	-	23.13	NA
	9/24/2003	12.77	NP	-	21.96	NA
	12/30/2003	11.00	NP	-	23.73	NA
	3/29/2004	10.46	NP	-	24.27	NA
	6/29/2004	11.93	NP	-	22.80	NA
	9/27/2004	12.67	NP	-	22.06	NA
<b>MW-26</b>	2/14/2000	10.44	NP	-	24.34	NA
(34.78)	5/22/2000	11.10	NP	-	23.68	NA
	8/23/2000	12.55	NP	-	22.23	NA
	11/28/2000	12.63	NP	-	22.15	NA
	2/21/2001	12.33	sheen	-	22.45	NA
	5/15/2001	12.24	NP	-	22.54	NA
	9/19/2001	13.47	sheen	-	21.31	NA
	12/19/2001	11.04	NP	-	23.74	NA
	3/13/2002	10.91	sheen	-	23.87	NA
	6/24/2002	11.88	NP	-	22.90	NA
	9/26/2002	13.07	NP	-	21.71	NA
	12/20/2002	12.55	NP	-	22.23	NA
	3/17/2003	10.93	NP	-	23.85	NA
	6/26/2003	12.00	NP	-	22.78	NA
	9/24/2003	13.13	NP	-	21.65	NA
	12/30/2003	11.53	NP	-	23.25	NA
	3/29/2004	10.46	NP	-	24.32	NA
	6/29/2004	12.43	NP	-	22.35	NA
	9/27/2004	13.03	NP	-	21.75	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-27</b>	2/14/2000	3.67	NP	-	32.02	NA
(35.69)	5/22/2000	4.91	NP	-	30.78	NA
	8/23/2000	6.15	NP	-	29.54	NA
	11/28/2000	5.49	NP	-	30.20	NA
	2/21/2001	5.64	NP	-	30.05	NA
	5/15/2001	5.31	NP	-	30.38	NA
	9/19/2001	6.68	NP	-	29.01	NA
	12/19/2001	4.40	NP	-	31.29	NA
	3/13/2002	3.97	NP	-	31.72	NA
	6/24/2002	5.75	NP	-	29.94	NA
	9/26/2002	6.50	NP	-	29.19	NA
	12/20/2002	5.19	NP	-	30.50	NA
	3/17/2003	4.46	NP	-	31.23	NA
	6/26/2003	5.83	NP	-	29.86	NA
	9/24/2003	6.60	NP	-	29.09	NA
	12/30/2003	4.60	NP	-	31.09	NA
	3/29/2004	4.83	NP	-	30.86	NA
	6/29/2004	5.94	NP	-	29.75	NA
	9/27/2004	6.07	NP	-	29.62	NA
<b>MW-28</b>	2/14/2000	4.03	NP	-	30.36	NA
(34.39)	5/22/2000	5.44	NP	-	28.95	1.0
	8/23/2000	9.55	NP	-	24.84	NA
	11/28/2000	11.34	sheen	-	23.05	0.4
	2/21/2001	8.52	8.51	0.01	25.88	0.1
	5/15/2001	8.54	sheen	-	25.85	NA
	9/19/2001	13.75	13.48	0.27	20.86	0.6
	12/19/2001	4.47	NP	-	29.92	0.4
	3/13/2002	4.49	sheen	-	29.90	NA
	6/24/2002	7.34	NP	-	27.05	NA
	9/26/2002	9.39	NP	-	25.00	NA
	12/23/2002	7.12	7.11	0.01	27.28	NA
	3/17/2003	4.68	4.66	0.02	29.73	0.05
	6/26/2003	7.15	sheen	-	27.24	0.03
	9/24/2003	13.25	13.21	0.04	21.17	0.2
	12/30/2003	5.87	NP	-	29.90	NA
	3/29/2004	5.97	sheen	-	29.80	NA
	6/29/2004	9.68	sheen	-	26.09	NA
	9/27/2004	13.35	13.33	0.02	21.06	NA



**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**

Kinder Morgan - Willbridge Terminal  
Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-29</b>	2/14/2000	12.98	NP	-	22.79	NA
(35.77)	5/22/2000	13.49	NP	-	22.28	NA
	8/23/2000	14.53	NP	-	21.24	NA
	11/28/2000	14.84	NP	-	20.93	NA
	2/21/2001	14.54	NP	-	21.23	NA
	5/15/2001	14.52	NP	-	21.25	NA
	9/19/2001	15.57	NP	-	20.20	NA
	12/19/2001	13.59	NP	-	22.18	NA
	3/13/2002	13.21	NP	-	22.56	NA
	6/24/2002	13.94	NP	-	21.83	NA
	9/26/2002	15.11	NP	-	20.66	NA
	12/20/2002	14.79	NP	-	20.98	NA
	3/17/2003	13.26	NP	-	22.51	NA
	6/26/2003	13.93	NP	-	21.84	NA
	9/24/2003	15.29	NP	-	20.48	NA
	12/30/2003	13.99	NP	-	21.78	NA
	3/29/2004	13.47	NP	-	22.30	NA
	6/29/2004	14.48	NP	-	21.29	NA
	9/27/2004	15.18	NP	-	20.59	NA
<b>MW-30</b>	2/14/2000	3.97	NP	-	32.42	NA
(36.39)	5/22/2000	5.37	NP	-	31.02	NA
	8/23/2000	7.06	NP	-	29.33	NA
	11/28/2000	7.34	NP	-	29.05	NA
	2/21/2001	6.74	NP	-	29.65	NA
	5/15/2001	6.50	NP	-	29.89	NA
	9/19/2001	8.28	NP	-	28.11	NA
	12/19/2001	4.35	NP	-	32.04	NA
	3/13/2002	4.31	NP	-	32.08	NA
	6/24/2002	6.28	NP	-	30.11	NA
	9/26/2002	7.64	NP	-	28.75	NA
	12/20/2002	7.11	NP	-	29.28	NA
	3/17/2003	4.72	NP	-	31.67	NA
	6/26/2003	6.14	NP	-	30.25	NA
	9/24/2003	7.85	NP	-	28.54	NA
	12/30/2003	4.87	NP	-	31.52	NA
	3/29/2004	5.21	NP	-	31.18	NA
	6/29/2004	6.71	NP	-	29.68	NA
	9/27/2004	7.71	NP	-	28.68	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-31</b>	2/14/2000	5.19	NP	-	30.47	NA
(35.66)	5/22/2000	6.66	NP	-	29.00	NA
	8/23/2000	8.41	NP	-	27.25	NA
	11/28/2000	8.86	NP	-	26.80	NA
	2/21/2001	8.07	NP	-	27.59	NA
	5/15/2001	7.90	NP	-	27.76	NA
	9/19/2001	9.69	NP	-	25.97	NA
	12/19/2001	5.43	NP	-	30.23	NA
	3/13/2002	5.31	NP	-	30.35	NA
	6/24/2002	7.67	NP	-	27.99	NA
	9/26/2002	9.09	9.06	0.03	26.59	NA
	12/20/2002	8.89	NP	-	26.77	NA
	3/17/2003	6.12	sheen	-	29.54	0.01
	6/26/2003	7.58	NP	-	28.08	NA
	9/24/2003	9.54	9.45	0.09	26.12	0.2
	12/30/2003	6.20	NP	-	29.46	NA
	3/29/2004	6.49	NP	-	29.17	NA
	6/29/2004	8.31	sheen	-	27.35	NA
	9/27/2004	9.38	sheen	-	26.28	NA
<b>MW-32</b>	2/14/2000	3.57	NP	-	33.44	NA
(37.01)	5/22/2000	4.83	NP	-	32.18	NA
	8/23/2000	6.41	NP	-	30.60	NA
	11/28/2000	6.69	NP	-	30.32	NA
	2/21/2001	6.11	NP	-	30.90	NA
	5/15/2001	5.99	NP	-	31.02	NA
	9/19/2001	7.64	NP	-	29.37	NA
	12/19/2001	4.30	NP	-	32.71	NA
	3/13/2002	3.71	NP	-	33.30	NA
	6/24/2002	5.72	NP	-	31.29	NA
	9/26/2002	7.18	NP	-	29.83	NA
	12/20/2002	6.72	NP	-	30.29	NA
	3/17/2003	4.15	sheen	-	32.86	0.01
	6/26/2003	5.53	NP	-	31.48	NA
	9/24/2003	7.28	NP	-	29.73	NA
	12/30/2003	4.58	NP	-	32.43	NA
	3/29/2004	4.65	NP	-	32.36	NA
	6/29/2004	6.25	NP	-	30.76	NA
	9/27/2004	7.16	NP	-	29.85	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-33</b>	2/14/2000	19.59	NP	-	19.75	NA
(39.34)	5/22/2000	20.15	NP	-	19.19	NA
	8/23/2000	20.88	NP	-	18.46	NA
	11/28/2000	20.98	NP	-	18.36	NA
	2/21/2001	20.78	NP	-	18.56	NA
	5/15/2001	20.83	NP	-	18.51	NA
	9/19/2001	21.43	NP	-	17.91	NA
	12/19/2001	12.62	NP	-	26.72	NA
	3/13/2002	19.61	NP	-	19.73	NA
	6/24/2002	20.42	NP	-	18.92	NA
	9/26/2002	21.13	NP	-	18.21	NA
	12/20/2002	20.66	NP	-	18.68	NA
	3/17/2003	19.73	NP	-	19.61	NA
	6/26/2003	20.31	NP	-	19.03	NA
	9/24/2003	21.04	NP	-	18.30	NA
	12/30/2003	19.82	NP	-	19.52	NA
	3/29/2004	19.89	NP	-	19.45	NA
	6/29/2004	20.65	NP	-	18.69	NA
	9/27/2004	21.16	NP	-	18.18	NA
<b>MW-34</b>	2/14/2000	19.31	NP	-	20.36	NA
(39.67)	5/22/2000	19.75	NP	-	19.92	NA
	8/23/2000	20.88	NP	-	18.79	NA
	11/28/2000	20.39	NP	-	19.28	NA
	2/21/2001	20.19	NP	-	19.48	NA
	5/15/2001	20.18	NP	-	19.49	NA
	9/19/2001	20.60	NP	-	19.07	NA
	12/19/2001	19.20	NP	-	20.47	NA
	3/13/2002	19.37	NP	-	20.30	NA
	6/24/2002	19.95	NP	-	19.72	NA
	9/26/2002	20.41	NP	-	19.26	NA
	3/17/2003	19.39	NP	-	20.28	NA
	6/26/2003	19.85	NP	-	19.82	NA
	9/24/2003	20.39	NP	-	19.28	NA
	12/30/2003	19.57	NP	-	20.10	NA
	3/29/2004	19.54	NP	-	20.13	NA
	6/29/2004	20.11	NP	-	19.56	NA
	9/27/2004	20.46	NP	-	19.21	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**

Kinder Morgan - Willbridge Terminal  
Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-35</b>	2/14/2000	2.34	NP	-	31.05	NA
(33.39)	5/22/2000	3.21	NP	-	30.18	NA
	8/23/2000	4.98	NP	-	28.41	NA
	11/28/2000	5.54	NP	-	27.85	NA
	2/21/2001	4.67	NP	-	28.72	NA
	5/15/2001	4.35	NP	-	29.04	NA
	9/18/2001	6.33	NP	-	27.06	NA
	12/19/2001	5.84	NP	-	27.55	NA
	3/13/2002	2.61	NP	-	30.78	NA
	6/24/2002	--Unable to Locate--				
	9/26/2002	5.85	NP	-	27.54	NA
	12/20/2002	5.91	sheen	-	27.48	NA
	3/17/2003	3.44	NP	-	29.95	NA
	6/26/2003	3.83	NP	-	29.56	NA
	9/24/2003	5.85	NP	-	27.54	NA
	12/30/2003	3.58	NP	-	29.81	NA
	3/29/2004	2.97	NP	-	30.42	NA
	6/29/2004	2.50	NP	-	30.89	NA
	9/27/2004	5.55	NP	-	27.84	NA
<b>MW-36</b>	2/14/2000	14.04	NP	-	20.84	NA
(34.88)	5/22/2000	14.62	NP	-	20.26	NA
	8/23/2000	15.39	NP	-	19.49	NA
	11/28/2000	15.72	NP	-	19.16	NA
	2/21/2001	15.49	NP	-	19.39	NA
	5/15/2001	15.51	NP	-	19.37	NA
	9/19/2001	16.08	NP	-	18.80	NA
	12/20/2001	14.98	NP	-	19.90	NA
	3/13/2002	14.18	NP	-	20.70	NA
	6/24/2002	--Unable to Access--				
	9/26/2002	17.92	NP	-	16.96	NA
	12/20/2002	15.59	NP	-	19.29	NA
	3/17/2003	14.25	NP	-	20.63	NA
	6/26/2003	--Unable to Access--				
	9/24/2003	15.74	NP	-	19.14	NA
	12/30/2003	14.97	NP	-	19.91	NA
	3/29/2004	14.37	NP	-	20.51	NA
	6/29/2004	15.33	NP	-	19.55	NA
	9/27/2004	15.87	NP	-	19.01	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness Groundwater (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-37</b>	2/14/2000	14.71	NP	-	20.15	NA
(34.86)	5/22/2000	15.27	NP	-	19.59	NA
	8/23/2000	16.06	NP	-	18.80	NA
	11/28/2000	16.32	NP	-	18.54	NA
	2/21/2001	16.10	NP	-	18.76	NA
	5/15/2001	16.11	NP	-	18.75	NA
	9/19/2001	16.69	NP	-	18.17	NA
	12/19/2001	15.10	NP	-	19.76	NA
	3/13/2002	14.64	14.62	0.02	20.24	0.1
	6/24/2002	15.66	NP	-	19.20	NA
	9/26/2002	16.39	NP	-	18.47	NA
	12/20/2002	16.11	sheen	-	18.75	NA
	3/17/2003	14.92	NP	-	19.94	NA
	6/26/2003	--Unable to Access--				
	9/24/2003	16.40	16.37	0.03	18.48	0.1
	12/30/2003	15.35	NP	NP	19.51	NA
	3/29/2004	14.93	14.94	0.01	19.94	0.1
	6/29/2004	15.96	sheen	-	18.90	
	9/27/2004	16.52	16.51	0.01	18.35	0.1
<b>MW-38</b>	2/14/2000	4.72	NP	-	32.78	NA
(37.50)	5/22/2000	6.17	NP	-	31.33	NA
	8/23/2000	8.02	NP	-	29.48	NA
	11/28/2000	8.41	NP	-	29.09	NA
	2/21/2001	7.62	NP	-	29.88	NA
	5/15/2001	7.65	sheen	-	29.85	NA
	9/18/2001	9.52	NP	-	27.98	NA
	12/19/2001	6.05	NP	-	31.45	NA
	3/13/2002	4.97	NP	-	32.53	NA
	6/24/2002	7.10	NP	-	30.40	NA
	9/26/2002	9.09	NP	-	28.41	NA
	12/23/2002	7.82	NP	-	29.68	NA
	3/17/2003	4.89	NP	-	32.61	NA
	6/26/2003	6.55	NP	-	30.95	NA
	9/24/2003	9.04	NP	-	28.46	NA
	12/30/2003	6.57	NP	-	30.93	NA
	3/29/2004	5.42	NP	-	32.08	NA
	6/29/2004	7.34	NP	-	30.16	NA
	9/27/2004	8.57	NP	-	28.93	NA

**TABLE 1B**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 Kinder Morgan - Willbridge Terminal  
 Portland, Oregon

Well Designation	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>MW-39</b>	2/14/2000	NM	NP	-	NA	NA
(35.02)	5/22/2000	13.56	NP	-	21.46	NA
	8/23/2000	14.15	NP	-	20.87	NA
	11/28/2000	14.52	NP	-	20.50	NA
	2/21/2001	14.30	NP	-	20.72	NA
	5/15/2001	14.24	NP	-	20.78	NA
	9/19/2001	14.82	NP	-	20.20	NA
	12/19/2001	13.52	NP	-	21.50	NA
	3/13/2002	13.26	NP	-	21.76	NA
	6/24/2002	--Unable to Locate--				
	9/26/2002	17.01	NP	-	18.01	NA
	12/20/2002	14.71	NP	-	20.31	NA
	3/17/2003	13.37	NP	-	21.65	NA
	6/26/2003	--Unable to Access--				
	9/24/2003	14.59	NP	-	20.43	NA
	12/30/2003	13.97	NP	-	21.05	NA
	3/29/2004	13.42	NP	-	21.60	NA
	6/29/2004	14.17	NP	-	20.85	NA
	9/27/2004	14.71	NP	-	20.31	NA
<b>MW-40</b>	2/14/2000	13.64	NP	-	20.01	NA
(33.65)	5/22/2000	14.28	NP	-	19.37	NA
	8/23/2000	15.01	NP	-	18.64	NA
	11/28/2000	15.15	NP	-	18.50	NA
	2/21/2001	14.97	NP	-	18.68	NA
	5/15/2001	15.00	NP	-	18.65	NA
	9/19/2001	15.58	NP	-	18.07	NA
	12/19/2001	13.72	NP	-	19.93	NA
	3/13/2002	13.58	NP	-	20.07	NA
	6/24/2002	14.62	NP	-	19.03	NA
	9/26/2002	17.30	NP	-	16.35	NA
	12/20/2002	15.78	NP	-	17.87	NA
	3/17/2003	13.84	NP	-	19.81	NA
	6/26/2003	14.45	NP	-	19.20	NA
	9/24/2003	15.25	NP	-	18.40	NA
	12/30/2003	14.03	NP	-	19.62	NA
	3/29/2004	14.04	NP	-	19.61	NA
	6/29/2004	14.85	NP	-	18.80	NA
	9/27/2004	15.35	NP	-	18.30	NA
<b>NOTES:</b> If SPH Thickness equals 0.0 feet, then non-measurable sheen was observed NP - No measurable product NA - Not Applicable NM - Not Measured * - SPH Recovered for latest quarter monitored $GWE = TOC - (DTW - (0.8 \times DTP - DTW))$ Where 0.8 = The density of the SPH						

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-1</b>	2/14/2000	16.82	NP	-	17.86	NA
(34.68)	5/22/2000	17.05	NP	-	17.63	NA
	8/22/2000	17.48	NP	-	17.20	NA
	11/27/2000	17.82	NP	-	16.86	NA
	2/20/2001	17.71	NP	-	16.97	NA
	5/15/2001	17.68	NP	-	17.00	NA
	9/18/2001	18.01	NP	-	16.67	NA
	12/20/2001	17.10	NP	-	17.58	NA
	3/13/2002	16.77	NP	-	17.91	NA
	6/24/2002	17.32	NP	-	17.36	NA
	9/26/2002	17.74	NP	-	16.94	NA
	12/20/2002	17.57	NP	-	17.11	NA
	3/17/2003	16.97	NP	-	17.71	NA
	6/26/2003	17.24	NP	-	17.44	NA
	9/24/2003	17.77	NP	-	16.91	NA
	12/30/2003	17.09	NP	-	17.59	NA
	3/29/2004	16.98	NP	-	17.70	NA
	6/29/2004	17.45	NP	-	17.23	NA
	9/27/2004	17.71	NP	-	16.97	NA
<b>B-2</b>	2/14/2000	16.68	NP	-	18.67	NA
(35.35)	5/22/2000	17.06	NP	-	18.29	NA
	8/22/2000	17.61	NP	-	17.74	NA
	11/27/2000	17.97	NP	-	17.38	NA
	2/20/2001	17.82	NP	-	17.53	NA
	5/15/2001	17.74	NP	-	17.61	NA
	9/18/2001	18.23	NP	-	17.12	NA
	12/20/2001	17.06	NP	-	18.29	NA
	3/13/2002	16.80	NP	-	18.55	NA
	6/24/2002	17.44	NP	-	17.91	NA
	9/26/2002	17.99	NP	-	17.36	NA
	12/20/2002	18.06	NP	-	17.29	NA
	3/17/2003	17.03	NP	-	18.32	NA
	6/26/2003	17.29	NP	-	18.06	NA
	9/24/2003	18.03	NP	-	17.32	NA
	12/30/2003	17.38	NP	-	17.97	NA
	3/29/2004	16.89	NP	-	18.46	NA
	6/29/2004	17.62	NP	-	17.73	NA
	9/27/2004	18.09	NP	-	17.26	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-3</b>	2/14/2000	18.14	NP	-	16.67	NA
(34.81)	5/22/2000	18.36	NP	-	16.45	NA
	8/22/2000	19.05	NP	-	15.76	NA
	11/27/2000	19.31	NP	-	15.50	NA
	2/20/2001	19.22	NP	-	15.59	NA
	5/15/2001	19.26	NP	-	15.55	NA
	9/18/2001	19.63	NP	-	15.18	NA
	12/20/2001	18.03	NP	-	16.78	NA
	3/13/2002	18.12	NP	-	16.69	NA
	6/24/2002	18.84	NP	-	15.97	NA
	9/26/2002	19.21	NP	-	15.60	NA
	12/20/2002	18.79	NP	-	16.02	NA
	3/17/2003	18.14	NP	-	16.67	NA
	6/26/2003	18.87	NP	-	15.94	NA
	9/24/2003	19.20	NP	-	15.61	NA
	12/30/2003	18.22	NP	-	16.59	NA
	3/29/2004	18.30	NP		16.51	NA
	6/29/2004	18.93	NP	-	15.88	NA
	9/27/2004	19.19	NP	-	15.62	NA
<b>B-4</b>	2/14/2000	18.25	17.59	0.66	16.98	3
(34.70)	5/22/2000	17.80	NP	-	16.90	0.5
	8/22/2000	18.22	18.21	0.01	16.49	NA
	11/27/2000	18.55	NP	-	16.15	NA
	2/20/2001	18.49	18.48	0.01	16.22	NA
	5/15/2001	18.47	18.46	0.01	16.24	0.1
	9/18/2001	18.75	18.74	0.01	15.96	0.1
	12/20/2001	18.05	NP	-	16.65	NA
	3/13/2002	17.69	NP	-	17.01	0.1
	6/24/2002	18.10	NP	-	16.60	NA
	9/26/2002	18.43	NP	-	16.27	NA
	12/20/2002	18.43	NP	-	16.27	NA
	3/17/2003	18.14	17.81	0.33	16.82	0.01
	6/26/2003	18.08	18.05	0.03	16.64	0.04
	9/24/2003	18.45	18.44	0.01	16.26	NA
	12/30/2003	18.05	NP	-	16.65	NA
	3/29/2004	17.90	17.70	0.20	16.96	0.1
	6/29/2004	18.61	sheen	-	16.09	NA
	9/27/2004	18.46	NP	-	16.24	NA



**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-5</b>	2/14/2000	16.24	NP	-	18.59	NA
(34.83)	5/22/2000	16.63	NP	-	18.20	NA
	8/22/2000	16.98	sheen	-	17.85	NA
	11/27/2000	17.36	NP	-	17.47	NA
	2/20/2001	17.23	NP	-	17.60	NA
	5/15/2001	17.18	NP	-	17.65	NA
	9/18/2001	17.49	NP	-	17.34	NA
	12/20/2001	16.68	NP	-	18.15	NA
	3/13/2002	16.28	NP	-	18.55	NA
	6/24/2002	16.88	NP	-	17.95	NA
	9/26/2002	17.28	NP	-	17.55	NA
	12/20/2002	17.43	NP	-	17.40	NA
	3/17/2003	16.51	NP	-	18.32	NA
	6/26/2003	16.71	NP	-	18.12	NA
	9/24/2003	17.33	NP	-	17.50	NA
	12/30/2003	16.86	NP	-	17.97	NA
	3/29/2004	16.33	NP	-	18.50	NA
	6/29/2004	16.99	NP	-	17.84	NA
	9/27/2004	17.35	NP	-	17.48	NA
<b>B-6</b>	2/14/2000	16.53	NP	-	18.96	NA
(35.49)	5/22/2000	16.95	NP	-	18.54	NA
	8/22/2000	17.40	NP	-	18.09	NA
	11/27/2000	17.80	NP	-	17.69	NA
	2/20/2001	17.64	NP	-	17.85	NA
	5/15/2001	17.56	NP	-	17.93	NA
	9/18/2001	17.95	NP	-	17.54	NA
	12/20/2001	17.02	NP	-	18.47	NA
	3/13/2002	16.57	NP	-	18.92	NA
	6/24/2002	17.22	NP	-	18.27	NA
	9/26/2002	17.71	NP	-	17.78	NA
	12/20/2002	17.80	NP	-	17.69	NA
	3/17/2003	16.81	NP	-	18.68	NA
	6/26/2003	17.04	NP	-	18.45	NA
	9/24/2003	17.73	NP	-	17.76	NA
	12/30/2003	17.21	NP	-	18.28	NA
	3/29/2004	16.61	NP	-	18.88	NA
	6/29/2004	17.35	NP	-	18.14	NA
	9/27/2004	17.80	NP	-	17.69	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-16</b>	2/14/2000	16.84	NP	-	18.98	NA
(35.82)	5/22/2000	17.27	NP	-	18.55	NA
	8/22/2000	17.76	NP	-	18.06	NA
	11/27/2000	18.16	NP	-	17.66	NA
	2/20/2001	17.98	NP	-	17.84	NA
	5/15/2001	18.04	NP	-	17.78	NA
	9/18/2001	18.44	NP	-	17.38	NA
	12/20/2001	17.43	NP	-	18.39	NA
	3/13/2002	17.02	NP	-	18.80	NA
	6/24/2002	17.67	NP	-	18.15	NA
	9/26/2002	18.18	NP	-	17.64	NA
	12/20/2002	18.31	NP	-	17.51	NA
	3/17/2003	17.24	NP	-	18.58	NA
	6/26/2003	17.46	NP	-	18.36	NA
	9/24/2003	18.21	NP	-	17.61	NA
	12/30/2003	17.67	NP	-	18.15	NA
	3/29/2004	17.06	NP	-	18.76	NA
	6/29/2004	17.80	NP	-	18.02	NA
	9/27/2004	18.28	NP	-	17.54	NA
<b>B-17</b>	2/14/2000	16.83	NP	-	18.78	NA
(35.61)	5/22/2000	17.20	NP	-	18.41	NA
	8/22/2000	17.76	NP	-	17.85	NA
	11/27/2000	18.05	NP	-	17.56	NA
	2/20/2001	17.88	NP	-	17.73	NA
	5/15/2001	17.84	NP	-	17.77	NA
	9/18/2001	18.21	NP	-	17.40	NA
	12/20/2001	17.31	NP	-	18.30	NA
	3/13/2002	16.91	NP	-	18.70	NA
	6/24/2002	17.50	NP	-	18.11	NA
	9/26/2002	17.97	NP	-	17.64	NA
	12/20/2002	18.07	NP	-	17.54	NA
	3/17/2003	17.13	NP	-	18.48	NA
	6/26/2003	17.33	NP	-	18.28	NA
	9/24/2003	18.00	NP	-	17.61	NA
	12/30/2003	17.48	NP	-	18.13	NA
	3/29/2004	16.39	NP	-	19.22	NA
	6/29/2004	17.62	NP	-	17.99	NA
	9/27/2004	18.03	NP	-	17.58	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
B-18	2/14/2000	18.55	NP	-	16.94	NA
(35.49)	5/22/2000	18.66	NP	-	16.83	NA
	8/22/2000	19.11	NP	-	16.38	NA
	11/27/2000	19.43	NP	-	16.06	NA
	2/20/2001	19.44	NP	-	16.05	NA
	5/15/2001	19.43	NP	-	16.06	NA
	9/18/2001	19.68	NP	-	15.81	NA
	12/20/2001	----Unable to Locate----				
	3/13/2002	----Inaccessible - Covered with Sand----				
	6/24/2002	----Inaccessible - Covered with Sand----				
	9/26/2002	---TOC broken, bentonite blocking well---				
(36.00)	12/20/2002	3.88	NP	-	32.12	NA
	3/17/2003	Unable to access				
	6/26/2003	Well blocked ~5 feet bgs				
	9/24/2003	Well blocked ~5 feet bgs				
	12/30/2003	Well blocked ~5 feet bgs				
	3/29/2004	Well blocked ~5 feet bgs				
	6/29/2004	Abandoned				
	9/27/2004	Abandoned				
B-22	2/14/2000	17.91	NP	-	17.92	1
(35.83)	5/22/2000	18.00	NP	-	17.83	NA
	8/22/2000	18.66	18.65	0.01	17.18	NA
	11/27/2000	19.02	sheen	-	16.81	0.1
	2/20/2001	19.02	18.99	0.03	16.83	NA
	5/15/2001	19.01	19.00	0.01	16.83	0.1
	9/18/2001	----- Well Has Been Buried -----				
	12/20/2001	----Well Damaged During Construction Activities----				
	3/13/2002	----Well Damaged During Construction Activities----				
	6/24/2002	----Well Damaged During Construction Activities----				
	9/26/2002	----Well Damaged During Construction Activities----				
		----- Well Abandoned December 10, 2002 -----				

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-22A</b>	12/20/2002	19.10	NP	-	15.77	NA
(34.87)	3/17/2003	18.33	18.30	0.03	16.54	0.01
	6/26/2003	18.72	18.69	0.03	16.15	0.05
	9/24/2003	19.08	19.05	0.03	15.79	0.10
	12/30/2003	18.52	NP	-	16.35	NA
	3/29/2004	18.25	18.25	sheen	16.62	NA
	6/29/2004	18.78	NP	-	16.09	NA
	9/27/2004	19.07	NP	-	15.80	NA
<b>B-25</b>	2/14/2000	18.39	NP	-	17.39	NA
(35.78)	5/22/2000	17.67	NP	-	18.11	NA
	8/22/2000	19.09	NP	-	16.69	NA
	11/27/2000	19.51	NP	-	16.27	NA
	2/20/2001	18.79	NP	-	16.99	NA
	5/15/2001	19.54	NP	-	16.24	NA
	9/18/2001	19.86	NP	-	15.92	NA
	12/20/2001	----Could Not Access----				
	3/13/2002	18.52	NP	-	17.26	NA
	6/24/2002	18.89	NP	-	16.89	NA
	9/26/2002	19.33	NP	-	16.45	NA
	12/20/2002	19.43	NP	-	16.35	NA
	3/17/2003	18.65	NP	-	17.13	NA
	6/26/2003	18.82	NP	-	16.96	NA
	9/24/2003	19.24	NP	-	16.54	NA
	12/30/2003	18.95	NP	-	16.83	NA
	3/29/2004	18.42	NP	-	17.36	NA
	6/29/2004	----Could Not Access----				
	9/27/2004	19.25	NP	-	16.53	NA
<b>B-27</b>	2/14/2000	17.61	NP	-	18.13	NA
(35.74)	5/22/2000	17.76	NP	-	17.98	NA
	8/22/2000	18.27	NP	-	17.47	NA
	11/27/2000	18.71	NP	-	17.03	0.1
	2/20/2001	18.66	18.65	0.01	17.09	0.2
	5/15/2001	18.74	18.66	0.08	17.06	0.2
	9/18/2001	18.99	NP	-	16.75	0.3
	12/20/2001	18.66	NP	-	17.08	0.2
	3/13/2002	17.76	NP	-	17.98	0.02
	6/24/2002	18.09	NP	-	17.65	NA
	9/26/2002	18.50	NP	-	17.24	NA
	12/20/2002	18.65	18.68	0.03	17.11	0.1
	3/17/2003	17.91	17.90	0.01	17.84	0.01
	6/26/2003	17.96	NP	-	17.78	NA
	9/24/2003	18.51	NP	-	17.23	NA
	12/30/2003	18.21	NP	-	17.53	NA
	3/29/2004	17.72	17.31	0.41	18.35	0.1
	6/29/2004	18.03	NP	-	17.71	NA
	9/27/2004	18.53	NP	-	17.21	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-35</b>	2/14/2000	15.71	NP	-	17.85	NA
(33.56)	5/22/2000	16.00	NP	-	17.56	NA
	8/22/2000	16.36	NP	-	17.20	NA
	11/27/2000	16.71	NP	-	16.85	NA
	2/20/2001	16.65	NP	-	16.91	NA
	5/15/2001	15.56	NP	-	18.00	NA
	9/18/2001	16.90	NP	-	16.66	NA
	12/20/2001	15.95	NP	-	17.61	NA
	3/13/2002	15.70	NP	-	17.86	NA
	6/24/2002	16.22	NP	-	17.34	NA
	9/26/2002	16.64	NP	-	16.92	NA
	12/20/2002	16.48	NP	-	17.08	NA
	3/17/2003	15.91	NP	-	17.65	NA
	6/26/2003	16.13	NP	-	17.43	NA
	9/24/2003	16.67	NP	-	16.89	NA
	12/30/2003	16.04	NP	-	17.52	NA
	3/29/2004	15.81	NP	-	17.75	NA
	6/29/2004	16.33	NP	-	17.23	NA
	9/27/2004	16.61	NP	-	16.95	NA
<b>B-36</b>	2/14/2000	14.33	NP	-	16.69	NA
(31.02)	5/22/2000	14.64	NP	-	16.38	NA
	8/22/2000	15.28	NP	-	15.74	NA
	11/27/2000	15.55	NP	-	15.47	NA
	2/20/2001	15.48	NP	-	15.54	NA
	5/15/2001	15.47	NP	-	15.55	NA
	9/18/2001	15.83	NP	-	15.19	NA
	12/20/2001	14.17	NP	-	16.85	NA
	3/13/2002	14.31	NP	-	16.71	NA
	6/24/2002	15.06	NP	-	15.96	NA
	9/26/2002	15.43	NP	-	15.59	NA
	12/20/2002	14.98	NP	-	16.04	NA
	3/17/2003	14.35	NP	-	16.67	NA
	6/26/2003	15.09	NP	-	15.93	NA
	9/24/2003	15.44	NP	-	15.58	NA
	12/30/2003	14.41	NP	-	16.61	NA
	3/29/2004	14.53	NP	-	16.49	NA
	6/29/2004	15.19	NP	-	15.83	NA
	9/27/2004	15.41	NP	-	15.61	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-37</b> (35.83)	2/14/2000	18.96	NP	-	16.87	NA
	5/22/2000	19.05	NP	-	16.78	NA
	8/22/2000	19.77	NP	-	16.06	NA
	11/27/2000	20.18	NP	-	15.65	NA
	2/20/2001	22.05	NP	-	13.78	NA
	5/15/2001	20.16	NP	-	15.67	NA
	9/18/2001	----- Well Has Been Buried -----				
	12/20/2001	----Could Not Locate----				
	3/13/2002	19.09	NP	-	16.74	NA
	6/24/2002	19.58	NP	-	16.25	NA
	9/26/2002	20.00	NP	-	15.83	NA
	12/20/2002	20.08	NP	-	15.75	NA
	3/17/2003	19.17	NP	-	16.66	NA
	6/26/2003	19.52	NP	-	16.31	NA
	9/24/2003	19.88	NP	-	15.95	NA
	12/31/2003	----Well Covered with Ice----				
	3/29/2004	19.07	NP	-	16.76	NA
	6/29/2004	19.96	NP	-	15.87	NA
	9/27/2004	19.88	NP	-	15.95	NA
<b>B-38</b> (36.65)	9/26/2002	20.91	20.69	0.22	15.74	NA
	12/20/2002	20.53	20.75	0.22	16.12	NA
	3/17/2003	19.71	NP	-	16.94	NA
	6/26/2003	20.10	NP	-	16.55	NA
	9/24/2003	Dry at 20.41 feet bgs				
	12/30/2003	19.93	NP	-	16.72	NA
	3/29/2004	dry	NP	-	-	NA
	6/29/2004	Dry at 20.23 feet bgs				
	9/27/2004	dry	NP	-	-	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-40</b>	2/14/2000	17.34	NP	-	17.36	1
(34.70)	5/22/2000	18.28	17.48	0.80	17.06	5.5
	8/22/2000	19.65	18.21	1.44	16.20	0.6
	11/27/2000	20.03	18.55	1.48	15.85	1.25
	2/20/2001	19.85	18.54	1.31	15.90	1.3
	5/15/2001	19.88	18.58	1.30	15.86	0.85
	9/18/2001	20.90	19.07	1.83	15.26	1
	12/20/2001	18.35	17.36	0.99	17.14	0.65
	3/13/2002	17.51	17.32	0.19	17.34	0.85
	6/24/2002	18.36	18.24	0.12	16.44	0.30
	9/26/2002	19.22	18.53	0.69	16.03	0.46
	12/20/2002	18.27	18.81	0.54	16.86	0.57
	3/17/2003	18.12	17.45	0.67	17.12	0.30
	6/26/2003	18.47	18.30	0.17	16.37	0.10
	9/24/2003	18.61	18.51	0.10	16.17	0.10
	12/30/2003	17.64	17.58	0.06	17.11	0.10
	3/29/2004	17.70	17.69	0.01	17.01	0.10
	6/29/2004	18.58	sheen	-	16.05	NA
	9/27/2004	18.76	sheen	-	15.87	0.10
<b>B-41</b>	2/14/2000	17.73	NP	-	16.90	NA
(34.63)	5/22/2000	18.89	NP	-	15.74	NA
	8/22/2000	18.44	NP	-	16.19	NA
	11/27/2000	18.81	NP	-	15.82	NA
	2/20/2001	18.78	sheen	-	15.85	NA
	5/15/2001	18.78	NP	-	15.85	NA
	9/18/2001	----- Well Has Been Buried -----				
	12/20/2001	16.86	NP	-	17.77	NA
	3/13/2002	20.07	20.03	0.04	14.59	NA
	6/24/2002	20.54	20.52	0.02	14.11	NA
	9/26/2002	18.75	18.72	0.03	15.90	NA
	----- Well Abandoned December 9, 2002 -----					
<b>B-41A</b>	12/20/2002	19.13	NP	-	16.00	NA
(35.13)	3/17/2003	18.40	NP	-	16.73	NA
	6/26/2003	18.73	NP	-	16.40	NA
	9/24/2003	19.10	NP	-	16.03	NA
	12/30/2003	18.61	NP	-	16.52	NA
	3/29/2004	18.32	NP	-	16.81	NA
	6/29/2004	18.82	NP	-	16.31	NA
	9/27/2004	19.11	NP	-	16.02	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>DW-1</b>	2/14/2000	18.87	NP	-	17.06	NA
(35.93)	5/22/2000	18.94	NP	-	16.99	NA
	8/22/2000	19.51	NP	-	16.42	NA
	11/27/2000	19.88	NP	-	16.05	NA
	2/20/2001	19.83	NP	-	16.10	NA
	5/15/2001	19.87	NP	-	16.06	NA
	9/18/2001	20.19	NP	-	15.74	NA
	12/20/2001	19.56	NP	-	16.37	NA
	3/13/2002	18.96	NP	-	16.97	NA
	6/24/2002	19.38	NP	-	16.55	NA
	9/26/2002	19.77	NP	-	16.16	NA
	12/20/2002	19.77	NP	-	16.16	NA
	3/17/2003	18.85	NP	-	17.08	NA
	6/26/2003	19.33	NP	-	16.60	NA
	9/24/2003	19.66	NP	-	16.27	NA
	12/30/2003	19.27	NP	-	16.66	NA
	3/29/2004	18.87	NP	-	17.06	NA
	6/29/2004	19.39	NP	-	16.54	NA
	9/27/2004	19.69	NP	-	16.24	NA
<b>DW-2</b>	2/14/2000	18.91	NP	-	17.14	NA
(36.05)	5/22/2000	19.03	NP	-	17.02	NA
	8/22/2000	19.62	NP	-	16.43	NA
	11/27/2000	10.01	NP	-	26.04	NA
	2/20/2001	20.02	NP	-	16.03	NA
	5/15/2001	20.00	NP	-	16.05	NA
	9/18/2001	20.35	NP	-	15.70	NA
	12/20/2001	19.62	NP	-	16.43	NA
	3/13/2002	19.06	NP	-	16.99	NA
	6/24/2002	19.44	NP	-	16.61	NA
	9/26/2002	19.85	NP	-	16.20	NA
	12/20/2002	19.88	NP	-	16.17	NA
	3/17/2003	18.97	NP	-	17.08	NA
	6/26/2003	19.40	NP	-	16.65	NA
	9/24/2003	19.78	NP	-	16.27	NA
	12/30/2003	19.37	NP	-	16.68	NA
	3/29/2004	18.97	NP	-	17.08	NA
	6/29/2004	19.46	NP	-	16.59	NA
	9/27/2004	19.85	NP	-	16.20	NA



**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>EX-39</b>	2/14/2000	17.42	17.09	0.33	15.93	10
(33.09)	5/22/2000	17.35	17.29	0.06	15.79	5
	8/22/2000	17.98	17.95	0.03	15.13	0.1
	11/27/2000	18.38	sheen	-	14.71	0.1
	2/20/2001	18.49	18.36	0.13	14.70	2.55
	5/15/2001	19.29	18.19	1.10	14.68	5.0
	9/18/2001	----- Well Has Been Buried -----				
	12/20/2001	----Well Damaged During Construction Activities----				
	3/13/2002	----Well Damaged During Construction Activities----				
	6/24/2002	----Well Damaged During Construction Activities----				
	9/26/2002	----Well Damaged During Construction Activities----				
		---- Well Abandoned December 9, 2002 ----				
<b>EX-39B</b>	12/20/2002	18.85	18.87	0.02	15.80	0.10
(34.63)	3/17/2003	18.15	18.13	0.02	16.50	0.10
	6/26/2003	18.71	18.71	sheen	15.92	0.05
	9/24/2003	18.98	NP	-	15.65	NA
	12/30/2003	18.30	sheen	sheen	16.33	NA
	3/29/2004	18.12	NP	-	16.51	NA
	6/29/2004	18.37	NP	-	16.26	NA
	9/27/2004	18.83	NP	-	17.24	NA
<b>IT-E</b>	2/14/2000	19.01	NP	-	17.06	NA
(36.07)	5/22/2000	19.03	NP	-	17.04	NA
	8/22/2000	19.93	NP	-	16.14	NA
	11/27/2000	20.12	NP	-	15.95	NA
	2/20/2001	20.11	NP	-	15.96	NA
	5/15/2001	20.29	NP	-	15.78	NA
	9/18/2001	20.65	NP	-	15.42	NA
	12/20/2001	----Could Not Access Well----				
	3/13/2002	19.31	NP	-	16.76	NA
	6/24/2002	19.80	NP	-	16.27	NA
	9/26/2002	20.18	NP	-	15.89	NA
	12/20/2002	19.95	NP	-	16.12	NA
	3/17/2003	19.25	NP	-	16.82	NA
	6/26/2003	19.68	NP	-	16.39	NA
	9/24/2003	20.01	NP	-	16.06	NA
	12/30/2003	19.45	NP	-	16.62	NA
	3/29/2004	19.28	NP	-	16.79	NA
	6/29/2004	19.79	NP	-	16.28	NA
	9/27/2004	20.05	NP	-	16.02	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>IT-W</b> (35.99)	2/14/2000	17.46	NP	-	18.53	NA
	5/22/2000	17.75	NP	-	18.24	NA
	8/22/2000	18.17	NP	-	17.82	NA
	11/27/2000	18.51	NP	-	17.48	NA
	2/20/2001	18.43	NP	-	17.56	NA
	5/15/2001	18.33	NP	-	17.66	NA
	9/18/2001	18.68	NP	-	17.31	NA
	12/20/2001	17.76	NP	-	18.23	NA
	3/13/2002	17.50	NP	-	18.49	NA
	6/24/2002	17.98	NP	-	18.01	NA
	9/26/2002	18.40	NP	-	17.59	NA
	12/20/2002	18.28	NP	-	17.71	NA
	3/17/2003	17.70	NP	-	18.29	NA
	6/26/2003	17.94	NP	-	18.05	NA
	9/24/2003	18.42	NP	-	17.57	NA
	12/30/2003	17.81	NP	-	18.18	NA
	3/29/2004	17.61	NP	-	18.38	NA
	6/29/2004	18.10	NP	-	17.89	NA
	9/27/2004	18.45	NP	-	17.54	NA
<b>P-1</b> (18.24)	2/14/2000	6.26	NP	-	11.98	NA
	5/22/2000	6.89	NP	-	11.35	NA
	8/22/2000	10.51	NP	-	7.73	NA
	11/27/2000	8.62	NP	-	9.62	NA
	2/20/2001	9.14	NP	-	9.10	NA
	5/15/2001	9.17	NP	-	9.07	NA
	9/18/2001	9.97	NP	-	8.27	NA
	12/20/2001	6.01	NP	-	12.23	NA
	3/13/2002	7.07	NP	-	11.17	NA
	6/24/2002	5.89	NP	-	12.35	NA
	9/26/2002	9.13	NP	-	9.11	NA
	12/20/2002	7.87	NP	-	10.37	NA
	3/17/2003	8.38	NP	-	9.86	NA
	6/26/2003	Dry at 10 feet bgs				
	9/24/2003	9.62	NP	-	8.62	NA
	12/30/2003	7.21	NP	-	11.03	NA
	3/29/2004	8.17	NP	-	10.07	NA
	6/29/2004	7.89	NP	-	10.35	NA
	9/27/2004	9.19	NP	-	9.05	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>P-2</b> (17.85)	2/14/2000	4.18	NP	-	13.67	NA
	5/22/2000	4.66	NP	-	13.19	NA
	8/22/2000	5.27	NP	-	12.58	NA
	11/27/2000	5.28	NP	-	12.57	NA
	2/20/2001	5.32	NP	-	12.53	NA
	5/15/2001	5.18	NP	-	12.67	NA
	9/18/2001	5.50	NP	-	12.35	NA
	12/20/2001	4.21	NP	-	13.64	NA
	3/13/2002	4.40	NP	-	13.45	NA
	6/24/2002	3.26	NP	-	14.59	NA
	9/26/2002	5.74	NP	-	12.11	NA
	12/20/2002	5.93	NP	-	11.92	NA
	3/17/2003	4.84	NP	-	13.01	NA
	6/26/2003	5.31	NP	-	12.54	NA
	9/24/2003	5.70	NP	-	12.15	NA
	12/30/2003	4.66	NP	-	13.19	NA
	3/29/2004	4.97	NP	-	12.88	NA
	6/29/2004	5.35	NP	-	12.50	NA
	9/27/2004	5.95	NP	-	11.90	NA
<b>RES-N</b> (38.58)	2/14/2000	20.90	NP	-	17.68	NA
	5/22/2000	21.01	NP	-	17.57	NA
	8/22/2000	21.58	NP	-	17.00	NA
	11/27/2000	21.95	NP	-	16.63	NA
	2/20/2001	21.98	NP	-	16.60	NA
	5/15/2001	21.94	NP	-	16.64	NA
	9/18/2001	22.27	NP	-	16.31	NA
	12/20/2001	21.55	NP	-	17.03	NA
	3/13/2002	21.02	NP	-	17.56	NA
	6/24/2002	21.41	NP	-	17.17	NA
	9/26/2002	21.79	NP	-	16.79	NA
	12/20/2002	21.83	NP	-	16.75	NA
	6/26/2003	21.35	NP	-	17.23	NA
	9/24/2003	21.72	NP	-	16.86	NA
	12/30/2003	21.34	NP	-	17.24	NA
	3/29/2004	20.93	NP	-	17.65	NA
	9/27/2004	21.15	NP	-	17.43	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>RES-O</b>	2/14/2000	16.89	NP	-	19.14	NA
(36.03)	5/22/2000	17.29	NP	-	18.74	NA
	8/22/2000	17.86	NP	-	18.17	NA
	11/27/2000	18.38	NP	-	17.65	NA
	2/20/2001	NM	NP	-	-	NA
	5/15/2001	18.04	NP	-	17.99	NA
	9/18/2001	18.43	NP	-	17.60	NA
	12/20/2001	17.63	NP	-	18.40	NA
	3/13/2002	16.87	NP	-	19.16	NA
	6/24/2002	18.52	NP	-	17.51	NA
	9/26/2002	19.23	NP	-	16.80	NA
	12/20/2002	18.35	NP	-	17.68	NA
	3/17/2003	17.18	NP	-	18.85	NA
	6/26/2003	17.40	NP	-	18.63	NA
	9/24/2003	18.25	NP	-	17.78	NA
	12/30/2003	17.56	NP	-	18.47	NA
	3/29/2004	16.74	NP	-	19.29	NA
	6/29/2004	No Access To Well				
	9/27/2004	No Access To Well				
<b>U-2</b>	2/14/2000	15.31	NP	-	19.71	NA
(35.02)	5/22/2000	15.41	NP	-	19.61	NA
	8/22/2000	16.13	NP	-	18.89	NA
	11/27/2000	16.81	NP	-	18.21	NA
	2/20/2001	16.81	NP	-	18.21	NA
	5/15/2001	16.82	NP	-	18.20	NA
	9/18/2001	17.20	NP	-	17.82	NA
	12/20/2001	16.99	NP	-	18.03	NA
	3/13/2002	15.59	NP	-	19.43	NA
	6/24/2002	15.80	NP	-	19.22	NA
	9/26/2002	16.50	NP	-	18.52	NA
	12/20/2002	16.95	NP	-	18.07	NA
	3/17/2003	15.77	NP	-	19.25	NA
	6/26/2003	15.89	NP	-	19.13	NA
	9/24/2003	16.42	NP	-	18.60	NA
	12/30/2003	16.28	NP	-	18.74	NA
	3/29/2004	15.06	NP	-	19.96	NA
	6/29/2004	15.79	NP	-	19.23	NA
	9/27/2004	16.30	NP	-	18.72	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>U-3</b>	2/14/2000	12.95	NP	-	22.30	NA
(35.25)	5/22/2000	13.55	NP	-	21.70	NA
	8/22/2000	14.19	NP	-	21.06	NA
	11/27/2000	15.68	NP	-	19.57	NA
	2/20/2001	14.38	NP	-	20.87	NA
	5/15/2001	14.26	NP	-	20.99	NA
	9/18/2001	14.89	NP	-	20.36	NA
	12/20/2001	13.22	NP	-	22.03	NA
	3/13/2002	13.01	NP	-	22.24	NA
	6/24/2002	13.57	NP	-	21.68	NA
	9/26/2002	14.39	NP	-	20.86	NA
	12/20/2002	14.23	NP	-	21.02	NA
	3/17/2003	13.97	NP	-	21.28	NA
	6/26/2003	13.56	NP	-	21.69	NA
	9/24/2003	14.54	NP	-	20.71	NA
	12/30/2003	13.41	NP	-	21.84	NA
	3/29/2004	12.83	NP	-	22.42	NA
	6/29/2004	14.75	NP	-	20.50	NA
	9/27/2004	14.21	NP	-	21.04	NA
<b>U-4</b>	2/14/2000	15.86	15.77	0.09	18.67	2.5
(34.46)	5/22/2000	16.03	NP	-	18.43	NA
	8/22/2000	16.38	NP	-	18.08	NA
	11/27/2000	16.83	NP	-	17.63	NA
	2/20/2001	16.85	sheen	-	17.61	NA
	5/15/2001	16.61	16.57	0.04	17.88	0.1
	9/18/2001	19.96	sheen	-	14.50	0.1
	12/20/2001	16.37	16.30	0.07	18.15	0.11
	3/13/2002	15.60	NP	-	18.86	0.11
	6/24/2002	15.50	NP	-	18.96	0.06
	9/26/2002	17.64	NP	-	16.82	NA
	12/20/2002	16.77	NP	-	17.69	NA
	3/17/2003	16.05	15.80	0.25	18.61	0.35
	6/26/2003	16.10	15.98	0.12	18.46	0.18
	9/24/2003	16.68	16.61	0.07	17.84	0.1
	12/30/2003	16.28	NP	-	18.18	NA
	3/29/2004	15.45	15.43	0.02	19.03	0.2
	6/29/2004	16.14	NP	-	18.32	NA
	9/27/2004	16.55	NP	-	17.91	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>U-5</b> (34.13)	2/14/2000	17.85	NP	-	16.28	NA
	5/22/2000	18.03	NP	-	16.10	NA
	8/22/2000	19.02	NP	-	15.11	NA
	11/27/2000	19.03	NP	-	15.10	NA
	2/20/2001	19.44	NP	-	14.69	NA
	5/15/2001	19.57	19.22	0.35	14.84	0.65
	9/18/2001	20.04	20.02	0.02	14.11	0.6
	12/20/2001	----Unable to Locate----				
	3/13/2002	----Inaccessible - Covered by Sand----				
	6/24/2002	----Inaccessible - Covered by Sand----				
	9/26/2002	19.63	19.41	0.22	14.68	0.20
	12/20/2002	19.49	NP	-	14.64	0.42
	3/17/2003	17.99	NP	-	16.14	NA
	6/26/2003	19.17	NP	-	14.96	NA
	9/24/2003	19.42	NP	-	14.71	NA
	12/30/2003	18.80	NP	-	15.33	NA
	3/29/2004	18.39	NP	-	15.74	NA
	6/29/2004	19.00	NP	-	15.13	NA
	9/27/2004	19.14	Sheen	-	14.99	NA
<b>U-5A</b> (33.77)	2/14/2000	6.46	NP	-	27.31	NA
	5/22/2000	7.00	6.99	0.01	26.78	1
	8/22/2000	8.58	8.57	0.01	25.20	0.1
	11/27/2000	9.71	NP	-	24.06	0.1
	2/20/2001	9.04	NP	-	24.73	0.1
	5/15/2001	8.99	sheen	-	24.78	NA
	9/18/2001	10.29	sheen	-	23.48	0.1
	12/20/2001	7.81	NP	-	25.96	NA
	3/13/2002	6.51	NP	-	27.26	NA
	6/24/2002	7.60	NP	-	26.17	NA
	9/26/2002	9.31	NP	-	24.46	NA
	12/20/2002	9.43	NP	-	24.34	NA
	3/17/2003	7.03	NP	-	26.74	NA
	6/26/2003	7.41	NP	-	26.36	NA
	9/24/2003	9.16	NP	-	24.61	NA
	12/30/2003	7.79	NP	-	25.98	NA
	3/29/2004	6.49	NP	-	27.28	NA
	6/29/2004	7.76	7.75	0.01	26.02	
	9/27/2004	9.03	8.98	0.05	24.78	NA

**TABLE 1C**  
**GROUNDWATER ELEVATION AND SPH REMOVAL DATA**  
 ConocoPhillips - Willbridge Terminal  
 Portland, Oregon

Well Designation (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>U-10</b>	6/26/2003	4.76	NP	-	NM	NA
	9/24/2003	5.00	NP	-	NM	NA
	12/30/2003	3.65	NP	-	NM	NA
	3/29/2004	4.45	NP	-	NM	NA
	9/27/2004	5.03	NP	-	NM	NA
<b>U-11</b>	6/26/2003	3.30	NP	-	NM	NA
	9/24/2003	3.29	NP	-	NM	NA
	12/30/2003	2.51	NP	-	NM	NA
	3/29/2004	2.94	NP	-	NM	NA
	9/27/2004	3.91	NP	-	NM	NA
<b>U-12</b>	6/26/2003	3.08	NP	-	NM	NA
	9/24/2003	3.17	NP	-	NM	NA
	12/30/2003	2.98	NP	-	NM	NA
	3/29/2004	2.97	NP	-	NM	NA
	9/27/2004	4.14	NP	-	NM	NA
<b>NOTES:</b> NP = No measurable product NA = Not Applicable NM = Not Measured * = SPH Recovered for latest quarter monitored - = No Measurable Product Thickness GWE = TOC -(DTW - (0.8 x DTP - DTW)) Where 0.8 = The density of the SPH						

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**

Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Xylenes (µg/l)
<b>CHEVRON</b>					
<b>B-7</b>	02/18/00	ND	20.1	ND	44.8
	05/23/00	ND	0.678	1.41	1.22
dup	05/23/00	ND	0.691	1.06	ND
	08/25/00	NS/F	NS/F	NS/F	NS/F
	11/30/00	NS/S	NS/S	NS/S	NS/S
	02/22/01	0.690	0.736	ND	ND
	05/17/01	ND	0.700	ND	ND
	03/20/03	ND	0.740	ND	ND
	09/29/03	<0.500	0.870	<0.500	1.93
	03/30/04	<0.500	0.750	<0.500	<1.00
<b>B-9</b>	05/23/00	ND	0.535	0.737	ND
	08/25/00	ND	ND	ND	ND
	11/30/00	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND
	05/17/01	ND	ND	ND	ND
	09/19/01	ND	ND	0.913	ND
	03/21/02	ND	ND	ND	ND
	09/24/02	ND	ND	ND	ND
	03/20/03	ND	ND	ND	ND
	03/30/04	<0.500	0.560	<0.500	<1.00
	10/06/04	<0.500	<0.500	<0.500	<1.00
<b>B-10</b>	02/18/00	3.85	4.42	8.78	14.7
dup	02/18/00	3.72	4.1	7.8	13.8
	05/23/00	3.72	4.1	7.8	13.8
dup	05/23/00	1.2	2.93	4.14	6.53
	08/25/00	1.40	2.80	1.45	4.80
	11/30/00	1.20	2.69	ND	4.60
	02/23/01	3.74	0.983	3.94	6.78
	05/17/01	4.87	1.25	4.36	8.56
	09/19/01	0.711	ND	1.80	2.50
	03/21/02	3.15	2.60	1.19	2.43
	09/24/02	1.41	1.43	0.753	2.46
	03/20/03	0.680	1.76	ND	2.34
	09/29/03	2.26	1.60	0.781	4.29
	03/30/04	<0.500	1.42	<0.500	2.66
	10/06/04	0.810	2.62	<0.500	6.55
<b>B-11</b>	02/18/00	29.2	6.14	4.36	14.1
	05/23/00	7.45	4.95	1.42	8.52
	08/25/00	11.2	6.53	2.39	11.2
	11/30/00	8.72	5.36	ND	ND
	02/22/01	24.2	2.13	5.11	8.98
	05/17/01	17.9	2.77	6.46	11.4
	03/30/04	9.20	4.74	0.790	5.90



**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**

Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Xylenes (µg/l)
<b>B-14</b>	02/18/00	119	18.1	80	38
	05/23/00	125	15.9	69.2	30.7
	08/25/00	382	44.6	194	70.3
	11/30/00	292	37.3	148	52.4
	02/22/01	402	229	42.6	78.2
	05/17/01	332	190	37.4	56.2
<b>B-19</b>	03/20/03	7.76	2.09	0.620	2.51
	09/29/03	5.93	1.98	1.56	7.44
	03/29/04	2.26	1.32	<0.500	2.88
<b>B-20</b>	03/20/03	ND	ND	ND	ND
	09/29/03	<0.500	<0.500	<0.500	1.38
	03/30/04	<0.500	<0.500	<0.500	<1.00
<b>B-21</b>	09/19/01	ND	ND	1.47	ND
	03/21/02	ND	0.679	ND	ND
	09/24/02	ND	1.20	0.517	1.20
	03/20/03	ND	ND	ND	ND
	09/29/03	0.659	1.3	<0.500	2.20
	03/29/04	<0.500	0.720	<0.500	<1.00
	10/06/04	<0.500	<0.880	<0.500	<1.00
<b>B-26</b>	03/30/04	<0.500	<0.500	<0.500	<1.00
<b>B-28</b>	02/18/00	0.754	0.368	0.545	0.986
	05/23/00	ND	ND	ND	ND
	08/25/00	ND	ND	ND	ND
	11/30/00	ND	ND	ND	ND
	02/23/01	ND	ND	ND	ND
	05/17/01	ND	ND	ND	ND
	09/20/01	2.12	2.93	ND	ND
	03/21/02	ND	ND	ND	ND
	09/24/02	ND	ND	ND	ND
	03/20/03	ND	ND	ND	ND
	09/29/03	0.699	<0.500	1.04	<1.00
	03/29/04	<0.500	<0.500	0.930	<1.00
<b>B-29</b>	09/20/01	1.30	ND	0.710	ND
	03/21/02	ND	ND	ND	ND
	09/24/02	ND	ND	ND	ND
	03/20/03	ND	ND	ND	ND
	09/29/03	<0.500	<0.500	<0.500	<1.00
	03/29/04	<0.500	<0.500	<0.500	<1.00

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**

Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Xylenes (µg/l)
<b>B-30</b>	02/18/00	38.9	5.29	2.44	10.3
	05/23/00	18.8	2.53	0.682	4.57
	08/25/00	81.2	12.5	2.35	21.9
	11/30/00	59.6	10.0	1.92	18.8
	02/23/01	61.6	5.31	9.52	19.4
dup**	02/23/01	61.8	3.24	9.23	16.0
	05/17/01	95.1	4.12	18.0	14.6
	09/20/01	38.7	ND	5.66	ND
dup	09/20/01	38.6	ND	6.18	ND
	03/21/02	113	17.0	6.09	24.2
	09/24/02	30.1	6.60	1.56	12.0
dup***	09/24/02	28.0	6.42	1.44	11.3
	03/20/03	17.3	4.49	0.500	5.96
dup*	03/20/03	17.4	4.43	0.510	6.68
	09/29/03	32.6	7.34	1.62	12.2
	03/29/04	15.6	3.13	1.16	7.07
dup	03/29/04	17.5	3.38	1.24	7.32
<b>B-32</b>	03/20/03	ND	ND	ND	ND
	09/29/03	<0.500	<0.500	0.636	<1.00
	03/29/04	<0.500	<0.500	<0.500	<1.00
<b>B-33</b>	03/20/03	ND	ND	ND	ND
	09/29/03	0.558	0.735	<0.500	1.35
	03/30/04	<0.500	<0.500	<0.500	<1.00
<b>CR-1</b>	09/20/01	ND	ND	ND	ND
	03/21/02	ND	ND	ND	ND
	09/24/02	ND	ND	ND	ND
	03/20/03	ND	ND	ND	ND
	09/29/03	<0.500	<0.500	<0.500	<1.00
	03/30/04	25.8	1.13	120	9.06
	10/06/04	<0.500	<0.500	<0.500	<1.00
<b>CR-8</b>	02/18/00	0.314	0.673	3.82	6.55
	05/23/00	ND	ND	ND	ND
	08/25/00	ND	ND	ND	ND
	11/30/00	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND
	05/16/01	ND	0.841	0.519	1.77

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**

Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Xylenes (µg/l)
<b>CR-9</b>	02/18/00	ND	ND	ND	ND
	05/23/00	ND	ND	ND	ND
	08/25/00	ND	ND	ND	ND
dup	08/25/00	ND	ND	ND	ND
	11/30/00	ND	ND	ND	ND
dup	11/30/00	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND
	05/16/01	ND	ND	ND	ND
dup	05/16/01	ND	ND	ND	ND
<b>CR-11</b>	02/18/00	81	4.95	4.41	6.17
	05/23/00	40.2	1.95	2.54	ND
	08/25/00	107	5.30	22.1	8.41
	11/30/00	NS/S	NS/S	NS/S	NS/S
	02/22/01	84.2	3.24	2.47	6.25
	05/16/01	119	5.85	4.43	14.3
<b>TB-LB</b>	02/22/01	ND	ND	ND	ND
	05/16/01	ND	ND	ND	ND
	09/19/01	ND	ND	ND	ND
	03/21/02	1.16	3.9	ND	1.95
	09/24/02	ND	ND	ND	ND
	03/20/03	ND	ND	ND	ND
	09/29/03	<0.500	<0.500	<0.500	<1.00

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**

Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Toluene (µg/l)	Ethyl- benzene (µg/l)	Xylenes (µg/l)
<b>Kinder Morgan</b>					
<b>MW-8</b>	02/16/00	9.79	2.51	7.97	12.1
	05/31/00	16.6	3.85	3.05	10.2
	08/24/00	26.0	5.78	28.2	24.0
	12/01/00	17.8	4.59	3.19	11.1
	02/22/01	11.4	ND	2.79	8.88
	05/16/01	15.1	1.18	2.79	6.4
	09/21/01	13.0	1.08	9.54	7.66
	03/14/02	1.95	1.09	0.618	2.22
dup	03/14/02	1.96	0.955	ND	1.93
	09/27/02	4.85	2.30	0.819	4.25
	03/18/03	3.12	ND	ND	2.24
dup	03/18/03	2.36	ND	ND	2.62
	09/24/03	5.00	1.20	0.759	7.05
	03/30/04	<0.500	<0.500	<0.500	<1.00
	09/27/04	3.03	0.576	<0.500	1.80
dup	09/27/04	3.25	<0.500	<0.500	1.75
<b>MW-10</b>	02/16/00	6.6	2.33	0.996	3.33
	05/31/00	6.78	0.794	ND	1.02
	08/24/00	ND	ND	ND	ND
	12/01/00	5.40	1.32	ND	1.78
	02/22/01	1.15	ND	1.15	1.98
	05/16/01	11.6	0.894	1.42	2.92
<b>MW-11</b>	02/16/00	5260	2360	2580	11200
	05/31/00	4120	1460	2720	9290
	08/24/00	2490	787	2020	5960
	12/01/00	2330	755	1610	5420
	02/22/01	3520	2230	1230	8130
	05/16/01	3800	2510	1290	8980
<b>MW-13</b>	02/16/00	ND	0.392	ND	0.903
	05/31/00	ND	ND	ND	ND
	08/24/00	ND	ND	ND	ND
	12/01/00	ND	ND	ND	ND
dup	12/01/00	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND
	05/16/01	ND	ND	ND	ND

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**

Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Xylenes (µg/l)
<b>MW-15</b>	02/17/00	2.89	0.493	0.442	1.15
	05/30/00	ND	ND	ND	ND
	08/24/00	ND	ND	ND	ND
	12/01/00	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND
	05/16/01	ND	ND	ND	ND
<b>MW-21</b>	02/17/00	ND	1.21	0.997	3.36
	05/30/00	ND	ND	ND	ND
	08/23/00	ND	ND	ND	ND
	12/01/00	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND
	05/16/01	ND	ND	ND	ND
<b>MW-22</b>	02/17/00	2060	2060	4720	13200
	05/30/00	2140	1560	4240	9150
	08/23/00	1670	1500	3670	7720
	12/01/00	1450	1330	3960	8280
	02/21/01	NS/S	NS/S	NS/S	NS/S
	05/16/01	NS/F	NS/F	NS/F	NS/F
<b>MW-23</b>	02/17/00	NS/F	NS/F	NS/F	NS/F
	05/30/00	NS/F	NS/F	NS/F	NS/F
	08/23/00	NS/F	NS/F	NS/F	NS/F
	12/01/00	NS/F	NS/F	NS/F	NS/F
	02/22/01	76.8	102	12.6	90.4
	05/16/01	NS/S	NS/S	NS/S	NS/S
<b>MW-25</b>	09/21/01	ND	ND	ND	ND
	03/14/02	ND	ND	ND	ND
	09/27/02	ND	ND	ND	ND
	03/18/03	ND	ND	ND	ND
	09/29/03	<0.500	<0.500	<0.500	<1.00
	03/30/04	<0.500	<0.500	<0.500	<1.00
	09/27/04	<0.500	<0.500	<0.500	<1.00

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**

Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Toluene (µg/l)	Ethyl- benzene (µg/l)	Xylenes (µg/l)
<b>MW-26</b>	02/17/00	1.31	4.01	18.6	26.2
dup	02/17/00	1.04	3.11	11.9	17.1
	05/30/00	ND	7.11	7.4	9.62
	08/23/00	ND	3.67	10.8	3.54
dup	08/23/00	ND	4.81	15.9	6.20
	12/01/00	3.43	29.8	7.28	15.6
	02/21/01	NS/S	NS/S	NS/S	NS/S
	05/17/01	15.1	8.76	10.1	10.6
	09/27/02	7.66	7.24	5.90	6.44
	03/18/03	9.11	ND	1.57	4.80
	09/24/03	2.18	<0.500	2.90	12.7
	03/30/04	<0.500	<0.500	<0.500	1.67
	09/27/04	2.41	1.42	4.64	7.57
<b>MW-28</b>	02/16/00	1.29	3.13	8.26	14.7
	05/30/00	NS/S	NS/S	NS/S	NS/S
	08/23/00	NS/S	NS/S	NS/S	NS/S
	12/01/00	NS/S	NS/S	NS/S	NS/S
	02/21/01	NS/F	NS/F	NS/F	NS/F
	05/16/01	NS/S	NS/S	NS/S	NS/S
<b>MW-31</b>	02/16/00	0.579	0.629	0.481	1.51
	05/30/00	ND	ND	ND	ND
	08/23/00	ND	ND	ND	ND
	12/01/00	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND
	05/17/01	ND	ND	ND	ND
<b>MW-32</b>	02/16/00	ND	0.608	0.379	1.31
	05/30/00	ND	ND	ND	ND
	08/23/00	ND	ND	ND	ND
	12/01/00	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND
	05/16/01	ND	ND	ND	ND

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**

Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Xylenes (µg/l)
<b>MW-33</b>	02/16/00	ND	0.718	0.589	1.21
	05/30/00	ND	ND	ND	ND
	08/24/00	ND	ND	ND	ND
	11/30/00	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND
dup	02/22/01	ND	ND	ND	ND
	05/16/01	ND	ND	ND	ND
	09/21/01	ND	ND	ND	ND
	03/14/02	ND	ND	ND	ND
	09/27/02	ND	ND	ND	ND
	03/18/03	ND	ND	ND	ND
	09/24/03	<0.500	<0.500	<0.500	<1.00
	03/29/04	<0.500	<0.500	<0.500	<1.00
	09/27/04	<0.500	<0.500	<0.500	<1.00
<b>MW-34</b>	09/21/01	ND	ND	ND	ND
	03/14/02	ND	ND	ND	ND
	09/27/02	ND	ND	ND	ND
	03/18/03	ND	ND	ND	ND
	09/24/03	<0.500	<0.500	<0.500	<1.00
	03/29/04	<0.500	<0.500	<0.500	<1.00
	09/27/04	<0.500	<0.500	<0.500	<1.00
<b>MW-36</b>	02/16/00	0.322	2.36	1.32	6.29
	05/31/00	ND	ND	ND	ND
	08/24/00	ND	ND	ND	ND
	11/30/00	ND	ND	0.548	ND
	02/21/01	ND	ND	ND	ND
	05/16/01	0.882	ND	ND	ND
	09/21/01	ND	ND	ND	ND
	03/13/02	ND	ND	ND	ND
	03/18/03	ND	ND	ND	ND
	09/24/03	0.727	<0.500	<0.500	1.38
	03/29/04	<0.500	<0.500	<0.500	<1.00
	09/27/04	<0.500	<0.500	<0.500	<1.00

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**

Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Xylenes (µg/l)
<b>MW-37</b>	02/16/00	1.06	0.456	0.492	1.78
	05/30/00	33	0.957	ND	2.1
dup	05/30/00	31.4	0.775	0.786	1.72
	08/24/00	40.9	0.731	ND	1.44
	11/30/00	10.7	0.594	ND	ND
	02/21/01	ND	ND	ND	ND
	05/16/01	0.691	ND	0.740	1.25
	09/21/01	ND	ND	1.04	1.31
	09/27/02	ND	ND	ND	ND
dup	09/27/02	ND	ND	ND	ND
	03/18/03	ND	ND	ND	ND
	09/24/03	NS/F	NS/F	NS/F	NS/F
	09/27/04	<0.500	<0.500	<0.500	<1.00
<b>MW-39</b>	09/27/04	<0.500	<0.500	<0.500	7.45
<b>MW-40</b>	02/16/00	ND	0.424	0.492	0.759
	05/30/00	ND	ND	ND	ND
	08/24/00	ND	ND	ND	ND
	11/30/00	ND	ND	ND	ND
	02/21/01	ND	ND	ND	ND
	05/16/01	ND	ND	0.505	ND
	09/21/01	ND	ND	ND	ND
	03/13/02	ND	ND	ND	ND
	09/27/02	ND	ND	ND	ND
	03/18/03	ND	ND	ND	ND
	09/24/03	<0.500	<0.500	<0.500	<1.00
dup	09/24/03	<0.500	<0.500	<0.500	<1.00
	03/29/04	<0.500	<0.500	<0.500	<1.00
dup	03/29/04	<0.500	<0.500	<0.500	<1.00
	09/27/04	<0.500	<0.500	<0.500	<1.00



**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**

Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Toluene (µg/l)	Ethyl- benzene (µg/l)	Xylenes (µg/l)
<b>CONOCOPHILLIPS</b>					
<b>B-4</b>	05/26/00	82.3	12.7	4	14.8
dup	05/26/00	74.8	10.7	2.77	10.3
	08/23/00	NS/F	NS/F	NS/F	NS/F
	11/29/00	7.04	5.81	2.10	8.09
	02/20/01	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F
	09/26/02	16.5	8.36	5.14	27.6
	09/25/03	48.1	7.55	6.02	17.9
<b>B-17</b>	02/17/00	274	24	15.4	37.7
	05/26/00	434	44.4	49.9	158
	08/28/00	372	21.1	10.8	15.4
	11/29/00	293	18.2	9.89	13.6
	02/23/01	258	11.8	21.3	21.6
dup	02/23/01	238	10.2	19.6	17.3
	05/17/01	165	6.82	17.0	15.7
dup	05/17/01	173	7.14	17.2	15.6
<b>B-18</b>	02/17/00	ND	1.04	3.46	6.13
	05/26/00	ND	ND	ND	ND
	08/28/00	ND	ND	ND	ND
	11/29/00	ND	ND	ND	ND
	02/23/01	ND	ND	ND	ND
	05/17/01	ND	0.502	ND	ND
<b>B-22</b>	02/17/00	NS/S	NS/S	NS/S	NS/S
	05/26/00	0.508	0.522	0.543	2.17
	08/28/00	NS/F	NS/F	NS/F	NS/F
	11/29/00	NS/S	NS/S	NS/S	NS/S
	02/20/01	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**

Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Xylenes (µg/l)
<b>B-35</b>	02/17/00	31.6	13.5	11	27.4
	05/26/00	194	16.3	12.5	39.8
	08/28/00	287	15.3	8.42	ND
	11/29/00	384	17.0	12.0	30.2
	02/23/01	45.6	4.87	12.4	20.5
	05/17/01	15.2	4.32	5.62	7.99
	09/20/01	58.0	3.31	9.78	15.9
	03/14/02	34.1	15.8	2.41	11.4
	09/26/02	95.8	11.3	14.0	26.3
	03/18/03	8.11	6.39	1.42	3.20
	09/25/03	66.7	7.41	3.74	19.2
	03/30/04	15.1	1.39	6.49	13.0
	09/28/04	93.4	11.7	<5.00	19.7
<b>B-36</b>	02/17/00	0.925	1.16	0.762	3.16
	05/26/00	ND	0.82	0.502	ND
	08/28/00	2.08	2.54	0.693	2.53
	11/29/00	1.14	2.53	1.02	2.78
	02/23/01	ND	0.512	1.15	1.44
	05/17/01	ND	0.545	0.819	1.8
	09/20/01	ND	0.609	0.761	1.50
dup	09/20/01	ND	0.547	0.820	1.51
	03/14/02	ND	ND	ND	ND
	09/26/02	1.18	1.33	0.635	2.48
	03/18/03	ND	ND	ND	ND
	09/25/03	0.940	1.10	0.954	2.90
	03/30/04	<0.500	<0.500	<0.500	1.23
	09/28/04	0.614	0.679	<0.500	<1.00
<b>B-37</b>	02/17/00	ND	0.517	0.63	1.18
dup	02/17/00	0.342	1.06	0.795	1.97
	05/26/00	ND	ND	ND	ND
	08/28/00	ND	ND	ND	ND
	11/29/00	ND	ND	ND	ND
	02/23/01	ND	ND	ND	ND
	05/17/01	ND	ND	ND	ND
	03/14/02	ND	ND	ND	ND
	09/26/02	ND	ND	ND	ND
	03/18/03	ND	ND	ND	ND
dup	03/18/03	ND	ND	ND	ND
	09/25/03	<0.500	<0.500	0.639	1.30
dup	09/25/03	<0.500	<0.500	0.628	1.24
	03/31/04	<0.500	<0.500	<0.500	<1.00
	09/28/04	<0.500	<0.500	<0.500	<1.00

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**

Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Xylenes (µg/l)
<b>B-40</b>	02/17/00	NS/S	NS/S	NS/S	NS/S
	05/26/00	NS/F	NS/F	NS/F	NS/F
	08/28/00	NS/F	NS/F	NS/F	NS/F
	11/29/00	NS/F	NS/F	NS/F	NS/F
	02/20/01	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F
<b>U-2</b>	02/17/00	3.13	1.93	3.59	3.43
	05/26/00	0.885	1.45	ND	ND
	08/28/00	ND	ND	0.604	ND
	11/29/00	ND	ND	ND	ND
	02/23/01	ND	ND	ND	ND
	05/17/01	ND	ND	ND	ND
	09/20/01	ND	ND	ND	ND
	03/14/02	0.986	1.60	0.905	ND
	09/26/02	ND	ND	ND	ND
	03/18/03	ND	ND	ND	ND
	09/25/03	<0.500	<0.500	<0.500	<1.00
	03/31/04	2.60	<0.500	0.820	<1.00
	09/28/04	<0.500	<0.500	<0.500	<1.00
<b>U-3</b>	02/17/00	0.355	0.993	0.952	3.17
	05/26/00	1.5	0.954	1.01	2.39
	08/28/00	ND	ND	0.793	ND
	11/29/00	ND	ND	0.744	ND
dup	11/29/00	0.500	0.567	0.727	ND
	02/23/01	14.8	1.84	2.58	ND
	05/17/01	7.83	ND	0.620	1.16
<b>U-4</b>	05/26/00	62.3	ND	ND	ND
	08/28/00	15.0	ND	1.76	ND
dup	08/28/00	14.3	0.509	2.99	1.04
	11/29/00	ND	ND	ND	ND
	02/23/01	0.844	6.84	1.07	11.2
	05/17/01	NS/F	NS/F	NS/F	NS/F
	09/26/02	0.760	0.552	1.07	2.99
dup	09/26/02	0.771	0.623	2.21	4.14
<b>U-5</b>	02/17/00	3.86	0.654	0.501	2.54
	05/26/00	3.49	ND	ND	ND
	08/28/00	ND	ND	ND	ND
	11/29/00	ND	ND	ND	ND
	02/23/01	1.56	1.16	ND	ND
	05/17/01	NS/F	NS/F	NS/F	NS/F
	03/18/03	2.49	2.21	5.77	33.7
	09/25/03	2.39	1.71	7.89	7.66
	03/31/04	1.53	<0.500	<0.500	<1.00
	09/28/04	<0.500	0.806	<0.500	1.80

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**

Willbridge Terminals  
Portland, Oregon

Well/Sample Identification	Date Sampled	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Xylenes (µg/l)
<b>U-10</b>	03/18/03	ND	ND	ND	ND
	09/25/03	<0.500	<0.500	<0.500	<1.00
	03/30/04	0.680	2.08	<0.500	4.01
	09/28/04	<0.500	<0.500	<0.500	<1.00
<b>U-11</b>	03/18/03	ND	ND	ND	ND
	09/25/03	1.74	1.37	1.04	1.74
	03/30/04	<0.500	<0.500	<0.500	<1.00
dup	03/30/04	0.650	1.93	<0.500	3.26
	09/28/04	<0.500	<0.500	<0.500	<1.00
<b>U-12</b>	03/18/03	5.30	2.12	0.642	3.72
	09/25/03	<0.500	0.563	<0.500	2.00
	03/30/04	<0.500	<0.500	<0.500	<1.00
	09/28/04	1.03	0.978	0.719	2.58
<b>P-1</b>	03/17/03	ND	ND	ND	ND
	03/31/04	<0.500	<0.500	<0.500	<1.00
	09/28/04	<0.500	<0.500	<0.500	<1.00
<b>P-2</b>	03/17/03	ND	0.534	ND	ND
	09/25/03	<0.500	<0.500	0.823	<1.00
	03/30/04	0.540	<0.500	<0.500	<1.00
	09/28/04	<0.500	<0.500	<0.500	<1.00
<b>TB-LB</b>	08/24/00	ND	ND	ND	ND
	08/25/00	ND	ND	ND	ND
	08/28/00	ND	ND	ND	ND
	11/29/00	ND	ND	ND	ND
	11/30/00	ND	ND	ND	ND
	12/01/00	ND	ND	ND	ND
	02/23/01	ND	ND	ND	ND

**Notes:**

2/00 and 5/00 data from IT Corporation

8/00, 11/00, 2/01 and 5/01 data from KHM Environmental Management, Inc.

NS/F = Not sampled floating product present

NS/S = Not sampled sheen present

µg/l = Micrograms per Liter

ND = Not detected at or below detection limit

BTEX analysis by USEPA Method 8021B

dup\* = duplicate for B-30 submitted as blind duplicate labeled as B-50

dup\*\*= duplicate for B-30 submitted as blind duplicate labeled as B-31

dup\*\*\* = duplicate for B-30 submitted as blind duplicate labeled as B-99

TB-LB = trip blank

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Number of benzene rings		Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene	
Well Identification	Date Sampled	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	
CHEVRON																		
B-7	02/18/00	5.22	ND	ND	ND	ND	ND	ND	ND	0.528	ND	7.26	16.3	ND	ND	17.6	0.962	
	05/23/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	17.2	ND	ND	13.6	ND	
	dup 05/23/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20.9	ND	ND	15.8	ND	
	08/25/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	
	11/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	
	02/22/01	1.33	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.64	ND	ND	2.82	ND
	05/17/01	0.934	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.59	ND	ND	0.564	ND
	03/20/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/29/03	2.12	ND	0.287	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.74	ND	ND	6.11	ND
	03/30/04	1.95	<0.200	0.436	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	7.73	<0.200	<1.60	5.95	<0.200	
B-9	02/18/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	
	05/23/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.43	ND	ND	1.3	ND	
	08/25/00	2.60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.40	ND	ND	1.33	ND	
	11/30/00	0.700	ND	0.600	0.460	0.240	0.400	ND	ND	ND	ND	ND	6.70	ND	0.780	0.200	0.160	
	02/22/01	1.78	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.20	ND	ND	0.528	ND	
	05/17/01	1.50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.60	ND	ND	0.386	ND	
	09/19/01	1.08	0.240	ND	ND	ND	ND	0.120	ND	ND	0.100	ND	4.00	0.100	0.260	0.780	0.100	
	03/21/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	09/24/02	1.40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.09	ND	ND	0.358	ND	
	03/20/03	0.242	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.508	ND	ND	ND	ND	
	09/30/03	1.29	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.38	ND	ND	0.265	ND	
	03/30/04	0.964	<0.300	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	3.10	<0.200	<1.50	0.951	0.234	

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>B-10</b>	02/18/00	3.58	ND	ND	0.0670	ND	ND	ND	ND	0.14	ND	0.632	11.8	ND	ND	12.9	0.513
dup	02/18/00	4.83	ND	2.9	5.47	ND	0.66	ND	ND	0.689	ND	1.95	15.9	ND	ND	23.4	1.85
	05/23/00	ND	ND	ND	ND	ND	ND	ND	ND	0.101	ND	ND	11.9	ND	ND	12.7	0.818
	08/25/00	1.63	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.18	ND	ND	2.91	ND
	11/30/00	1.42	ND	0.320	ND	ND	ND	ND	ND	ND	ND	ND	2.24	ND	0.980	0.160	0.120
	02/23/01	1.01	ND	0.252	ND	ND	ND	ND	ND	ND	ND	0.234	1.25	ND	ND	1.33	0.225
	05/17/01	0.635	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.976	ND	ND	0.521	ND
	09/19/01	0.420	ND	ND	ND	ND	ND	0.100	ND	ND	ND	0.200	0.300	0.100	0.360	ND	0.240
	03/21/02	ND	ND	0.188	ND	ND	ND	ND	ND	ND	ND	0.190	1.23	ND	ND	1.23	0.220
	09/24/02	1.04	0.132	1.49	ND	ND	0.170	ND	0.189	ND	ND	ND	1.32	ND	0.717	1.34	0.245
	03/20/03	1.05	ND	0.190	ND	ND	ND	ND	ND	ND	ND	0.194	1.30	ND	ND	1.27	0.236
	09/29/03	1.09	ND	0.234	ND	ND	ND	ND	ND	ND	ND	0.463	1.91	ND	ND	2.11	0.436
	03/30/04	1.65	<0.200	0.671	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	0.588	5.22	<0.200	<2.40	5.67	0.891
<b>B-11</b>	02/18/00	1.75	ND	ND	ND	ND	0.547	ND	ND	ND	ND	ND	2.15	ND	ND	1.53	0.764
	05/23/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.891	0.169
	08/25/00	1.35	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.47	ND	ND	1.76	ND
	11/30/00	2.10	0.400	1.02	0.400	0.180	0.180	ND	ND	ND	ND	ND	2.88	ND	1.20	0.260	ND
	02/22/01	ND	ND	0.106	ND	ND	ND	ND	ND	ND	ND	ND	1.12	ND	ND	0.815	ND
	05/17/01	0.478	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.729	ND	ND	0.358	ND
	03/30/04	0.931	<0.300	<0.300	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	1.06	<0.200	<3.50	0.604	0.418
<b>B-14</b>	02/18/00	1.08	ND	0.222	0.01	ND	ND	ND	ND	0.104	ND	0.561	1.84	ND	7	1.9	0.582
	05/23/00	ND	ND	1.85	ND	ND	ND	ND	ND	ND	ND	0.467	ND	ND	ND	1.36	0.621
	08/25/00	1.16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.75	ND	24.5	2.06	ND
	11/30/00	0.920	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.60	ND	0.980	ND	ND
	02/22/01	ND	ND	0.187	ND	ND	ND	ND	ND	ND	ND	0.390	1.10	ND	ND	1.16	0.489
	05/17/01	0.738	ND	0.106	ND	ND	ND	ND	ND	ND	ND	0.341	0.966	ND	1.72	0.892	0.338

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>B-19</b>	03/20/03	1.69	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.440	ND	ND	6.62	ND
	09/29/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.68	ND	ND	13.2	ND
	03/29/04	2.12	<1.00	<1.00	<1.00	0.0213	<0.0200	<0.0200	<0.0200	<1.00	<0.0200	<1.00	7.01	<0.0200	<3.50	11.9	<1.00
<b>B-20</b>	03/20/03	0.322	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.577	ND	ND	ND	ND
	09/29/03	1.52	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.86	ND	ND	4.27	ND
	03/30/04	1.07	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	3.81	<0.200	<1.50	0.988	<0.200
<b>B-21</b>	09/19/01	3.40	0.200	1.78	0.360	0.360	0.320	0.400	0.300	0.540	0.160	1.52	16.1	0.320	1.18	16.8	1.54
	03/21/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.38	ND	ND	3.84	ND
	09/24/02	2.30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.66	ND	ND	4.15	ND
	03/20/03	2.71	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.0	ND	ND	7.00	ND
	09/29/03	3.18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.94	ND	ND	8.86	0.394
	03/29/04	2.52	<0.500	<0.500	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	0.0396	<0.0200	<0.500	8.76	<0.0200	<3.00	7.58	0.259
<b>B-26</b>	03/30/04	0.778	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	0.299	0.649	<0.200	27.5	1.08	0.447
<b>B-28</b>	02/18/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.09	ND	ND
	05/23/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/25/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/30/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/23/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/17/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/20/01	ND	ND	ND	ND	ND	ND	0.100	ND	ND	ND	ND	ND	0.100	ND	ND	ND
	03/21/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/24/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/20/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/30/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.767	ND	ND
	03/29/04	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0400	<0.0200	<0.100	<0.0400	<0.0200

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>B-29</b>	09/20/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/21/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/24/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/20/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/30/03	ND	ND	ND	ND	0.121	0.136	0.157	0.114	0.111	ND	0.132	ND	0.123	ND	ND	0.138
	03/29/04	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0300	<0.0200	<0.0600	<0.0200	<0.0200
<b>B-30</b>	02/18/00	0.121	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.113	0.177	ND	ND	0.175	0.202
	05/23/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.105	ND
	08/25/00	0.385	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.530	ND	ND	0.423	ND
	11/30/00	0.280	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.440	ND	0.280	0.300	0.100
	02/23/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	dup** 02/23/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/17/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.116	ND	ND	0.108	ND
	09/20/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.100	ND	0.100	ND	ND
	dup 09/20/01	ND	ND	ND	ND	ND	ND	0.100	ND	ND	0.100	ND	ND	0.120	0.100	ND	ND
	03/21/02	0.162	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.312	ND	ND	0.157	0.114
	dup 03/21/02	0.162	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.314	ND	ND	0.164	0.123
	09/24/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/20/03	0.142	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.133	ND	ND	0.132	ND
	dup* 03/20/03	0.108	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.126	ND	ND	0.105	ND
	09/30/03	ND	ND	ND	0.582	0.585	0.421	0.323	0.443	0.531	ND	0.827	0.349	0.272	ND	0.451	1.51
	dup*** 09/30/03	ND	ND	ND	0.473	0.416	0.410	0.291	0.357	0.450	ND	0.728	ND	0.248	ND	0.432	1.26
	03/29/04	0.119	<0.0200	0.0449	0.0576	0.0507	0.0420	0.0344	0.0393	0.0633	<0.0200	0.123	0.173	0.0295	<0.320	0.170	0.240
	dup*** 03/29/04	<0.280	<0.800	0.0485	0.0605	0.0596	0.0452	0.0417	0.0438	0.0637	<0.0200	0.112	0.216	0.0361	<0.640	0.170	0.244
<b>B-32</b>	03/20/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.161	ND	ND	ND	0.108
	09/29/03	ND	ND	ND	0.114	0.112	0.114	ND	0.114	0.188	ND	0.557	1.06	ND	ND	ND	0.498



**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>B-33</b>	03/20/03	0.589	ND	ND	ND	ND	0.385	0.370	ND	0.306	ND	0.449	2.01	0.300	ND	0.914	0.458
	09/30/03	11.0	ND	3.30	8.28	19.2	44.0	37.5	26.4	34.1	7.35	20.2	33.3	30.6	ND	39.7	29.5
	38076.00	3.03	<2.00	2.42	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	12.5	<2.00	<4.50	13.6	3.28
<b>B-99</b>	09/24/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.000	ND	0.132	ND	ND
<b>CR-1</b>	09/20/01	0.520	ND	ND	ND	0.120	0.100	0.140	0.100	ND	0.120	ND	1.94	0.140	0.300	0.160	ND
	03/21/02	0.216	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.789	ND	ND	0.194	ND
	09/24/02	1.40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.32	ND	0.887	0.660	ND
	03/20/03	0.758	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.53	ND	ND	0.748	ND
	09/30/03	1.31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.02	ND	ND	1.11	ND
	03/30/04	0.473	<0.150	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	1.59	<0.100	<0.650	0.322	<0.100
<b>CR-8</b>	02/18/00	0.749	ND	0.264	0.981	2.47	1.6	2.92	1.3	1.28	3.42	1.34	ND	1.96	ND	0.125	1.97
	05/23/00	ND	ND	0.223	0.232	0.61	0.46	0.981	0.331	0.326	ND	0.27	ND	0.613	ND	ND	0.458
	08/25/00	ND	ND	ND	0.313	0.666	0.445	0.755	0.455	0.434	ND	0.674	ND	ND	ND	ND	0.913
	11/30/00	ND	ND	ND	ND	0.120	ND	0.160	ND	ND	ND	ND	ND	0.100	ND	ND	0.180
	02/22/01	ND	0.284	0.105	0.536	1.25	0.970	1.46	0.628	0.923	ND	0.749	0.103	0.960	ND	0.108	1.41
	05/16/01	ND	ND	ND	ND	0.389	0.301	0.459	ND	0.229	ND	0.371	ND	0.326	ND	ND	0.472
<b>CR-9</b>	02/18/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/23/00	ND	ND	0.115	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/25/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	dup 08/25/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/30/00	ND	ND	ND	ND	ND	ND	0.160	0.120	ND	ND	ND	ND	0.120	ND	ND	0.100
	dup 11/30/00	ND	ND	ND	0.140	0.260	0.260	0.400	0.300	0.200	ND	0.160	ND	0.320	ND	ND	0.240
<b>CR-11</b>	02/22/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/16/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	dup 05/16/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/18/00	0.333	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.982	ND	ND	0.327	ND
	05/23/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/25/00	0.402	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.20	ND	ND	0.450	ND
<b>CR-11</b>	11/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/22/01	0.208	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.457	ND	ND	ND	ND
	05/16/01	0.149	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.221	ND	ND	ND	ND

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

		Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
Number of benzene rings		2	2	3	4	5	4	5	4	4	5	3	2	5	2	3	4
Well Identification	Date Sampled	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
KINDER MORGAN																	
MW-8	02/16/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.66	ND	ND
	05/31/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/24/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.53	ND	ND
	12/01/00	0.240	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.680	0.140	0.160
	02/22/01	0.221	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.104	ND
	05/16/01	0.149	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dup	05/16/01	0.128	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/21/01	0.160	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.260	0.100	ND
	03/14/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dup	03/14/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/27/02	0.148	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/18/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dup	03/18/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/24/03	0.181	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/30/04	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.100	<0.100	<0.100	<0.200	<0.100	<0.100
	09/27/04	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.100	<0.100	<0.100	<0.350	<0.100	<0.100
dup	09/27/04	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.100	<0.100	<0.100	<0.300	<0.100	<0.100
MW-10	02/16/00	0.113	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0759	0.0845
	05/31/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/24/00	0.119	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/01/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.180	ND	ND
	02/22/01	0.134	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/16/01	0.104	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-11	02/16/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.66	ND	410	ND	ND
	05/31/00	ND	ND	0.159	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	555	0.256	ND
	08/24/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	451	ND	ND
	12/01/00	0.200	0.120	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.300	ND	ND	0.160	ND
	02/22/01	0.247	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	411	0.184	ND
	05/16/01	0.117	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.185	ND	572	0.108	ND

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**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>MW-13</b>	02/16/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/31/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/24/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/01/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	dup 12/01/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>MW-15</b>	05/16/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/17/00	0.118	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0743	ND	ND	ND	ND
	05/30/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/24/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/01/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>MW-21</b>	05/16/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/17/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/30/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/23/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/01/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<b>MW-22</b>	05/16/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/17/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.23	ND	356	1.09	ND
	05/30/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	345	ND	ND
	08/23/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	386	ND	ND
	12/01/00	0.300	0.160	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.500	ND	ND	0.400	ND
	02/21/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/16/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Number of benzene rings	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
			(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>MW-23</b>	02/17/00		NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/30/00		NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	08/23/00		NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	12/01/00		NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	02/22/01		2.31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.12	ND	35.0	3.27	ND
	05/16/01		NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
<b>MW-25</b>	09/21/01		0.240	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.120	ND	ND
	03/14/02		0.172	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/27/02		0.194	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.101
	03/18/03		0.163	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/24/03		0.289	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/30/04		0.233	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.100	<0.100	<0.100	<0.350	<0.100	<0.100
	09/27/04		0.384	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.100	<0.100	<0.100	<0.500	<0.100	<0.100
<b>MW-26</b>	02/17/00		2.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.19	1.7	ND	2.69	2.27	1.05
dup	02/17/00		1.78	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.99	1.43	ND	2.24	1.74	0.714
	05/30/00		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.84	ND	ND	1.84	ND
	08/23/00		2.27	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.23	1.92	ND	ND	2.39	ND
dup	08/23/00		2.27	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.12	1.98	ND	ND	2.63	ND
	12/01/00		0.840	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.580	0.320	ND	0.380	ND	0.360
	02/21/01		NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/17/01		1.86	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.40	ND	ND	1.88	ND
	09/18/01		NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	03/13/02		NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	09/27/02		1.61	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.510	1.43	ND	ND	2.36	ND
	03/18/03		1.07	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.641	0.974	ND	7.16	1.51	ND
	09/24/03		1.86	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.596	1.61	ND	ND	2.3	ND
	03/30/04		1.33	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.400	<0.200	1.52	<0.200	<3.80	0.357	0.219
	09/27/04		2.33	<0.200	0.277	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.400	0.985	2.07	<0.200	<2.00	2.01	0.664

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>MW-28</b>	02/16/00	2.68	ND	ND	ND	ND	ND	ND	ND	1.00	ND	0.792	6.69	ND	ND	8.54	2.71
	05/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	08/24/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	12/01/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/21/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/16/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
<b>MW-31</b>	02/16/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.988	ND	ND	0.457	0.0887
	05/30/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/23/00	0.243	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.666	ND	ND	0.463	ND
	12/01/00	0.100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.300	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.568	ND	ND	0.363	ND
	05/17/01	0.206	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.597	ND	ND	0.352	ND
<b>MW-32</b>	02/16/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/30/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/23/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/01/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.12	ND	ND
	02/22/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/16/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
MW-33	02/16/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/30/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/24/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/30/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.222	ND	ND
	dup 02/22/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.161	ND	ND
	05/16/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/21/01	0.340	ND	ND	0.100	ND	0.220	0.140	0.120	0.200	ND	0.180	ND	0.120	0.160	ND	0.160
	03/14/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/27/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/18/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/24/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/29/04	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	0.0209
	09/27/04	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
MW-34	09/21/01	0.280	ND	ND	ND	ND	ND	0.100	ND	ND	ND	ND	ND	0.120	0.120	ND	ND
	03/14/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/27/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/18/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/24/03	0.151	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/29/04	0.0524	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0600	<0.0200	<0.0200
	09/27/04	0.135	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.100	<0.100	<0.100	<0.150	<0.100	<0.100
MW-36	02/16/00	0.143	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/31/00	0.228	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/24/00	0.269	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/30/00	0.420	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.180	ND	ND
	02/21/01	0.304	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/16/01	0.247	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/21/01	0.240	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.140	ND	ND
	03/13/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/18/03	0.178	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/24/03	0.307	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/29/04	0.246	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.200	0.0525	0.0487
	09/27/04	0.710	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.100	<0.150	<0.100	<1.00	<0.100	<0.100

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
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Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>MW-37</b>	02/16/00	1.56	ND	0.0862	0.0584	0.0773	0.0564	ND	ND	583	ND	0.158	3.02	ND	ND	0.605	0.214
	05/30/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.126	ND	ND	ND	0.451	0.153
	08/24/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.25	ND	ND	ND	ND
	11/30/00	0.680	0.180	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.600	ND	0.660	0.200	0.120
	02/21/01	0.183	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.228	ND	ND	ND	ND
	02/21/01 <sup>1</sup>	0.588	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.513	ND	ND	0.207	ND
	05/16/01	0.401	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.327	ND	ND	0.146	ND
	09/21/01	0.140	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.280	0.120	ND
	03/13/02	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	09/27/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.499	ND	ND	0.166	0.122
dup	09/27/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.147	ND
	03/18/03	0.435	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.731	ND	ND	ND	ND
	09/03/04																
	03/04/04																
	09/27/04	<1.00	<1.00	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	0.122	<1.00	<0.100	<1.00	0.184	0.251
<b>MW-39</b>	09/27/04	4.30	<0.100	0.159	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	0.338	1.23	<0.100	<1.60	1.16	0.348
<b>MW-40</b>	02/16/00	0.0972	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/30/00	0.124	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/24/00	0.141	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/30/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/21/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/16/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/21/01	ND	ND	ND	ND	ND	ND	0.120	ND	ND	0.100	0.380	ND	0.140	ND	0.120	0.240
	03/13/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/27/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/18/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/24/03	0.109	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dup	09/24/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/29/04	0.0609	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0900	<0.0300	<0.0200
dup	03/29/04	0.0588	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0900	0.0266	<0.0200
	09/27/04	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100

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Willbridge Terminals  
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		Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
Number of benzene rings		2	2	3	4	5	4	5	4	4	5	3	2	5	2	3	4
Well Identification	Date Sampled	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>CONOCOPHILLIPS</b>																	
<b>B-4</b>	02/17/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/26/00	13.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.19	17.3	ND	ND	28.4	2.24
dup	05/26/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2	ND	ND	ND	20.9	1.72
	08/28/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/29/00	2.50	ND	0.620	0.140	ND	ND	ND	ND	ND	ND	1.60	2.54	ND	8.80	4.72	1.24
	02/20/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	09/18/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	03/13/02	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	09/26/02	2.16	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.889	3.42	ND	ND	4.26	0.859
	03/17/03	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	09/25/03	2.79	ND	0.857	ND	ND	ND	ND	ND	ND	ND	1.24	5.10	ND	ND	6.24	1.23
<b>B-17</b>	02/17/00	2.28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.42	ND	ND	4.25	ND
	05/26/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.1	ND	ND	5.33	ND
	08/28/00	2.92	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.5	ND	ND	7.10	
	11/29/00	1.72	0.340	0.180	ND	ND	ND	ND	ND	ND	ND	0.320	5.50	ND	0.880	4.96	0.260
	02/23/01	2.36	ND	0.139	ND	ND	ND	ND	ND	ND	ND	ND	8.20	ND	ND	2.93	ND
dup	02/23/01	2.52	ND	0.236	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.372	ND	3.84	ND
	05/17/01	2.19	ND	0.294	ND	ND	ND	ND	ND	ND	ND	ND	7.83	ND	ND	4.24	ND
dup	05/17/01	2.19	ND	0.265	ND	ND	ND	ND	ND	ND	ND	ND	8.25	ND	ND	4.14	ND
<b>B-18</b>	02/17/00	1.41	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.39	ND	ND	1.83	ND
	05/26/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/28/00	1.28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.84	ND	ND	1.17	ND
	11/29/00	0.220	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.440	ND	ND	0.220	ND
	02/23/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.11	ND	ND	ND	ND
	05/17/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.529	ND	ND	ND	ND



**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
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Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>B-22</b>	02/17/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/26/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	15.4	ND	ND	21.5	ND
	08/28/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/29/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/20/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
<b>B-35</b>	02/17/00	11	ND	5.15	1.19	ND	ND	ND	ND	1.1	ND	8.29	30	ND	ND	35.8	4.33
	05/26/00	ND	ND	2.61	ND	ND	ND	ND	ND	ND	ND	2.93	22.5	ND	ND	20.7	1.73
	08/28/00	6.77	ND	0.807	0.123	ND	ND	ND	ND	0.127	ND	1.12	13.7	ND	ND	8.35	0.584
	11/29/00	2.84	0.360	0.520	0.240	ND	ND	ND	ND	0.200	ND	1.46	6.30	ND	1.22	7.16	0.760
	02/23/01	8.44	ND	ND	0.304	ND	0.102	ND	ND	0.330	ND	ND	16.2	ND	ND	17.3	1.15
	05/17/01	4.34	ND	0.493	0.103	ND	ND	ND	ND	0.106	ND	0.692	11.3	ND	ND	5.50	0.425
	09/20/01	2.92	0.360	0.680	0.200	ND	0.120	ND	ND	0.200	ND	1.20	6.74	ND	1.00	10.0	0.700
	03/14/02	3.02	ND	0.620	ND	ND	ND	ND	ND	ND	ND	0.844	7.62	ND	ND	6.78	0.468
	09/26/02	4.76	ND	0.740	0.109	ND	ND	ND	ND	ND	ND	1.00	11.6	ND	ND	9.41	0.570
	03/18/03	3.46	ND	0.493	ND	ND	ND	ND	ND	ND	ND	0.578	14.3	ND	ND	7.51	0.434
	09/25/03	5.36	ND	0.779	ND	ND	ND	ND	ND	ND	ND	0.884	10.2	ND	ND	8.86	0.399
	03/30/04	3.52	<0.200	0.456	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	0.419	7.21	<0.200	<2.10	5.18	0.274
	09/28/04	5.25	<0.200	0.579	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.400	0.662	9.23	<0.200	<2.70	6.80	0.455

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
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Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>B-36</b>	02/17/00	0.251	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.537	ND	ND	ND	ND
	05/26/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/28/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/29/00	0.720	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.34	ND	0.520	0.180	ND
	02/23/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/17/01	0.642	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.91	ND	ND	ND	ND
	09/20/01	0.360	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.920	ND	0.320	0.200	ND
dup	09/20/01	0.320	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.880	ND	0.300	0.100	ND
	03/14/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.262	ND	ND	ND	ND
	09/26/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.26	ND	ND	ND	ND
	03/18/03	0.240	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.811	ND	ND	ND	ND
	09/25/03	0.584	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.22	ND	ND	ND	ND
	03/30/04	3.51	<0.200	0.490	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	0.429	6.79	<0.200	<2.10	5.07	0.268
	09/28/04	0.653	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.100	1.51	<0.100	<1.60	<0.100	<0.100
dup	09/28/04	0.723	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.100	1.24	<0.100	<1.35	<0.100	<0.150
<b>B-37</b>	02/17/00	0.0698	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0547
dup	02/17/00	0.0683	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0731
	05/26/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/28/00	0.124	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/29/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/23/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.128	ND
	05/17/01	0.110	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/14/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/26/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/18/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dup	03/18/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/25/03	0.120	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dup	09/25/03	0.113	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.118	ND
	03/31/04	0.0737	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.320	<0.0300	0.0431
	09/28/04	0.142	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.100	<0.100	<0.100	<0.300	<0.100	<0.100

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>B-40</b>	02/17/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/26/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	08/28/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/29/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	02/20/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
<b>U-2</b>	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	02/17/00	0.140	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.683	0.224	ND	ND	0.104	0.0856
	05/26/00	0.119	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.239	ND	ND	0.122	ND
	08/28/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.73	ND	ND	ND	ND
	11/29/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/23/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	05/17/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/20/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/14/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/26/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/18/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/25/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/31/04	0.166	<0.0200	0.0201	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.100	0.237	<0.0200	<1.12	0.0680	0.0787
	09/28/04	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.100	<0.100	<0.100	<0.150	<0.100	<0.100
<b>U-3</b>	02/17/00	0.142	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17	ND	ND	0.066	ND
	05/26/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.119	ND	ND	ND	ND
	08/28/00	0.145	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.163	ND	ND	ND	ND
	11/29/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.120	ND	0.160	ND	ND
	dup 11/29/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.120	ND	ND
	02/23/01	0.117	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.152	ND	ND	ND	ND
	05/17/01	0.11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.134	ND	ND	ND	ND

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
U-4	02/16/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.92	ND	ND	7.42	ND
	05/26/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.44	ND	ND	7.11	ND
	08/28/00	5.05	ND	1.32	ND	ND	ND	ND	ND	ND	ND	ND	11.6	ND	ND	12.4	1.17
	dup 08/28/00	4.47	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.367	10.4	ND	ND	6.48	0.544
	11/29/00	1.66	ND	0.660	ND	ND	ND	ND	ND	ND	ND	0.220	3.38	ND	0.760	1.92	0.340
	02/23/01	13.0	ND	4.14	ND	ND	ND	ND	ND	0.727	ND	ND	31.6	ND	ND	40.6	4.08
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	09/18/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	03/13/02	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	09/26/02	2.88	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.60	ND	ND	8.14	0.571
	dup 09/26/02	3.40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.72	ND	ND	9.70	0.842
	03/17/03	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
U-5	02/17/00	1.19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.63	ND	ND	1.42	0.0674
	05/26/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.04	ND
	08/28/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.52	ND	ND	2.29	ND
	11/29/00	0.800	0.100	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.02	ND	2.60	1.06	ND
	02/23/01	ND	ND	0.124	ND	ND	ND	ND	ND	ND	ND	ND	3.28	ND	ND	1.64	ND
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	09/18/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	09/26/02	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	03/18/03	ND	ND	ND	1.08	ND	ND	2.54	ND	1.89	ND	ND	36.0	ND	ND	55.0	11.3
	09/25/03	5.52	ND	1.13	ND	ND	ND	ND	ND	ND	ND	ND	9.61	ND	4.71	10.7	1.31
	03/31/04	3.15	<0.400	0.921	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	5.18	<0.400	<2.50	5.49	1.06
	09/28/04	4.54	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<1.00	<0.500	6.51	<0.500	<3.25	5.66	<0.500
U-10	03/18/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.345	ND	ND
	09/25/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/30/04	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	0.0302	<0.0200	<0.0200
	09/28/04	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.200	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100

**TABLE 3**  
**GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
Willbridge Terminals  
Portland, Oregon

Well Identification	Date Sampled	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
<b>U-11</b>	03/18/03	0.711	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.44	ND	ND	0.951	ND
	09/25/03	1.45	ND	0.229	ND	ND	ND	ND	ND	ND	ND	0.391	4.69	ND	ND	3.25	0.396
	03/30/04	1.73	<0.200	0.395	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	0.610	5.29	<0.200	<2.60	4.32	0.821
	09/28/04	<0.171	<0.114	<0.171	<0.114	<0.114	<0.114	<0.114	<0.114	0.114	<0.229	<0.286	<0.343	<0.114	<0.343	<0.343	0.341
<b>U-12</b>	03/18/03	1.72	ND	0.308	ND	ND	ND	ND	ND	ND	ND	0.384	7.94	ND	ND	3.91	0.541
	09/25/03	0.277	ND	0.138	ND	ND	ND	ND	ND	ND	ND	ND	1.25	ND	0.231	1.59	ND
	03/30/04	0.151	<0.0400	<0.0600	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	0.621	<0.0400	<0.320	0.238	0.0434
	09/28/04	1.21	<0.100	0.304	0.193	<0.100	<0.100	<0.100	<0.100	0.153	<0.200	0.616	2.56	<0.100	<1.20	2.56	0.832
<b>P-1</b>	03/18/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/31/04	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	0.0405
<b>P-2</b>	03/17/03	2.61	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.62	ND	ND	2.05	ND
	9/25/03 <sup>2</sup>	1.93	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.85	ND	ND	4.23	ND
	03/30/04	1.97	<0.200	<0.300	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	7.66	<0.200	<1.70	3.28	<0.200
	09/28/04	2.28	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.400	<0.200	8.23	<0.200	<1.40	3.56	<0.200

**NOTES:**

- = Not sampled, not analyzed, not applicable

µg/l = Micrograms per Liter

ND = Not detected at or above method detection limit

2/00 and 5/00 data from IT Corporation

8/00, 11/00, 2/01 and 5/01 data from KHM Environmental Management, Inc.

IT Corp Data recorded as reported in Second Quarter 2000 Report

Analytes reported in alphabetical order

NS/F = Not sampled floating product present

NS/S = Not sampled sheen present

1 = Sample rerun outside of hold time due to low surrogate recovery reported in the initial sample as a result of an extraction error.

2 = Sample ID was misidentified by the laboratory as D-2

dup\* = duplicate for B-30 submitted as blind duplicate labeled as B-50

dup\*\*= duplicate for B-30 submitted as blind duplicate labeled as B-31

dup\*\*\*= duplicate for B-30 submitted as blind duplicate labeled as B-130

PAHs by EPA Method 8270M-SIM

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>CHEVRON</b>											
<b>B-7</b>	02/18/00	0.028	0.122	0.00107	0.0066	0.0134	0.00425	ND	0.00125	ND	0.0234
	05/23/00	0.0268	0.228	ND	0.0264	0.0441	0.0115	ND	0.00193	ND	0.0863
dup	05/23/00	0.0276	0.259	ND	0.0304	0.051	0.0137	ND	0.00211	ND	0.104
	08/25/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/22/01	0.0310	0.0719	ND	ND	0.00311	ND	ND	ND	ND	0.00513
	05/17/01	0.0364	0.0587	ND	ND	0.00157	ND	ND	ND	ND	ND
	03/20/03	0.0275	0.0642	ND	ND	0.0209	ND	ND	ND	ND	ND
	09/29/03	0.0304	0.0815	ND	0.00278	0.00608	0.00121	ND	0.00132	ND	0.00782
	03/30/04	0.0303	0.0869	0.00138	0.00320	0.00647	0.00175	<0.000200	<0.00100	<0.00100	0.0135
<b>B-9</b>	05/23/00	0.0177	0.139	ND	0.0176	0.0286	0.00848	ND	0.00123	ND	0.0616
	08/25/00	0.0116	0.0534	ND	0.00270	0.00750	0.00214	ND	ND	ND	0.0228
	11/30/00	0.0108	0.153	0.00149	0.0159	0.0354	0.0114	ND	0.00125	ND	0.0823
	02/22/01	0.0173	0.0460	ND	ND	0.00213	ND	ND	0.00127	ND	ND
	05/17/01	0.0208	0.0706	ND	0.00444	0.00634	0.00241	ND	ND	ND	0.0161
	09/19/01	0.0161	0.0753	ND	0.00256	0.00993	0.00266	ND	ND	ND	0.0136
	03/21/02	0.0105	0.0488	ND	0.00257	0.00683	0.00398	ND	ND	ND	0.0506
	09/24/02	0.0185	0.0469	ND	ND	ND	ND	ND	ND	ND	ND
	03/20/03	0.00992	0.0401	ND	0.00165	0.00421	0.00317	ND	ND	ND	0.0283
	09/30/03	0.00905	0.137	0.00136	0.00812	0.0285	0.0155	ND	ND	ND	0.0532
	03/30/04	0.0384	0.349	0.00382	0.0395	0.0991	0.0467	<0.000200	0.00147	<0.00100	0.331
<b>B-10</b>	02/18/00	0.0367	0.337	0.00084	0.0355	0.0572	0.0202	ND	0.00053	0.00019	0.0965
dup	02/18/00	0.0394	0.375	0.00141	0.0448	0.0745	0.027	ND	0.00525	0.0002	0.123
	05/23/00	0.0354	0.211	ND	0.0265	0.0384	0.0115	ND	0.00229	ND	0.0631
	08/25/00	0.0314	0.0657	ND	0.00199	0.00366	0.00141	ND	0.00105	ND	0.177
	11/30/00	0.0307	0.0946	ND	0.00590	0.00800	0.00257	ND	0.00131	ND	0.0165
	02/23/01	0.0323	0.0611	ND	ND	ND	ND	ND	0.00184	ND	ND
	05/17/01	0.0395	0.0567	ND	ND	ND	ND	ND	ND	ND	ND
	09/19/01	0.0234	0.194	ND	0.0249	0.0466	0.0161	ND	0.00104	ND	0.0793
	03/21/02	0.0301	0.0644	ND	ND	ND	ND	ND	ND	ND	ND
	09/24/02	0.0290	0.0607	ND	ND	ND	ND	ND	ND	ND	ND
	03/20/03	0.0327	0.0620	ND	ND	ND	ND	ND	ND	ND	ND
	09/29/03	0.0337	0.0820	ND	0.00285	0.00441	0.00217	ND	0.00165	ND	0.0132
	03/30/04	0.0332	0.128	<0.00100	0.0100	0.0162	0.00783	<0.000200	<0.00100	<0.00100	0.0402

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>B-11</b>	02/18/00	0.0386	0.985	0.00408	0.130	0.214	0.0959	ND	0.0034	0.00047	0.356
	05/23/00	0.0219	0.236	ND	0.0258	0.0407	0.0172	ND	0.00233	ND	0.0732
	08/25/00	0.0292	0.0809	ND	0.00543	0.00765	0.00398	ND	ND	ND	0.0273
	11/30/00	0.0277	0.113	ND	0.00986	0.0127	0.00575	ND	0.00146	ND	0.0288
	02/22/01	0.0234	0.0573	ND	ND	ND	ND	ND	ND	ND	ND
	05/17/01	0.0291	0.0553	ND	ND	ND	ND	ND	ND	ND	ND
	03/30/04	0.0241	0.115	0.00164	0.00904	0.0152	0.00896	<0.000200	<0.00100	<0.00100	0.0315
<b>B-14</b>	02/18/00	0.0367	0.297	0.0006	0.029	0.053	0.0403	0.000095	0.00134	0.00016	0.0874
	05/23/00	0.0327	0.155	ND	0.0152	0.0264	0.0186	ND	0.00168	ND	0.0421
	08/25/00	0.0300	0.0774	ND	0.00175	0.00339	0.00568	ND	0.00113	ND	0.0207
	11/30/00	0.0292	0.0724	ND	ND	ND	0.00326	ND	0.00124	ND	ND
	02/22/01	0.0299	0.0603	ND	ND	0.00202	0.00102	ND	0.00104	ND	0.00696
	05/17/01	0.0373	0.0553	ND	ND	ND	ND	ND	ND	ND	ND
<b>B-19</b>	03/20/03	0.0453	0.0693	ND	ND	ND	ND	ND	ND	ND	ND
	09/29/03	0.0404	0.208	ND	0.0203	0.0297	0.00909	0.000234	ND	ND	0.0577
	03/29/04	0.0435	0.104	<0.00100	0.00487	0.00831	0.00279	<0.000200	<0.00100	<0.00100	0.0192
<b>B-20</b>	03/20/03	0.0107	0.0459	ND	0.00109	0.00389	ND	ND	ND	ND	0.00501
	09/29/03	0.130	4.35	0.0494	0.808	1.14	0.643	0.000934	0.00840	ND	3.96
	03/30/04	0.00165	0.0417	<0.00100	0.00184	0.00508	0.00121	<0.00200	<0.00100	<0.00100	0.00910
<b>B-21</b>	09/19/01	0.0306	0.107	ND	0.00833	0.0107	0.00322	ND	ND	ND	0.0259
	03/21/02	0.0405	0.0662	ND	ND	ND	ND	ND	ND	0.00109	0.00852
	09/24/02	0.0412	0.0695	ND	ND	ND	ND	ND	ND	ND	ND
	03/20/03	0.0740	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/29/03	0.0474	0.0759	ND	ND	ND	ND	ND	ND	ND	ND
	03/29/04	0.0469	0.132	<0.00100	0.00984	0.0141	0.00478	<0.00200	<0.00100	<0.00100	0.0340
<b>B-26</b>	03/30/04	0.00345	0.232	0.0305	0.0220	0.0485	0.0415	<0.000200	<0.00100	<0.00100	0.140

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>B-28</b>	02/18/00	0.0122	0.422	0.00368	0.0437	0.104	0.0496	0.000088	0.00156	0.00025	0.165
	05/23/00	0.00956	0.245	0.00144	0.0258	0.0468	0.0205	ND	0.00277	ND	0.0913
	08/25/00	0.00530	0.120	ND	0.00825	0.0152	0.00565	ND	0.00134	ND	0.0504
	11/30/00	0.0179	0.459	ND	0.0421	0.0640	0.0303	ND	0.00271	ND	0.149
	02/23/01	0.00756	0.131	ND	0.00896	0.0142	0.00555	ND	0.00181	ND	0.0363
	05/17/01	0.00561	0.0914	ND	0.00498	0.00737	0.00272	ND	0.00199	ND	0.0200
	09/20/01	0.0434	0.0821	ND	0.00166	0.00546	ND	ND	0.00109	ND	0.00782
	03/21/02	0.00407	0.0692	ND	0.00311	0.0115	0.00292	ND	ND	ND	0.0148
	09/24/02	0.00298	0.0519	ND	ND	ND	ND	ND	0.00244	ND	ND
	03/20/03	0.00220	0.0489	ND	ND	ND	ND	ND	0.00164	ND	ND
	09/30/03	0.0219	0.483	0.00173	0.0572	0.109	0.0404	ND	ND	ND	0.205
	03/29/04	0.00600	0.111	0.00118	0.00942	0.0287	0.00852	<0.000200	<0.00100	<0.00100	0.0341
<b>B-29</b>	09/20/01	0.0110	0.292	ND	0.0286	0.0531	0.0264	ND	0.00385	ND	0.122
	03/21/02	0.00126	0.0600	ND	ND	0.00372	ND	ND	ND	ND	0.00710
	09/24/02	ND	0.0601	ND	ND	ND	ND	ND	0.00103	0.00102	ND
	03/20/03	ND	0.0593	ND	ND	0.00263	ND	ND	0.00143	ND	ND
	09/30/03	0.00332	0.322	0.0133	0.0295	0.167	0.0280	ND	ND	ND	0.125
	03/29/04	0.00528	0.367	0.0206	0.0293	0.162	0.0457	<0.000200	<0.00100	<0.00100	0.146
<b>B-30</b>	02/18/00	0.0185	0.327	0.0355	0.0269	0.0671	0.0482	ND	0.00265	0.00021	0.238
	05/23/00	0.0141	0.117	0.00978	0.00904	0.0713	0.0108	ND	0.00267	ND	0.0527
	08/25/00	0.0221	0.0497	0.01460	0.00153	0.0176	0.00449	ND	ND	ND	0.0632
	11/30/00	0.0175	0.0513	ND	ND	ND	ND	ND	0.00103	ND	0.0116
	02/23/01	0.0144	0.0704	ND	ND	ND	ND	ND	ND	ND	ND
dup**	02/23/01	0.0140	0.0670	ND	ND	ND	ND	ND	ND	ND	ND
	05/17/01	0.0177	0.0477	ND	ND	ND	ND	ND	0.00175	ND	ND
	09/20/01	0.00211	0.0825	0.00167	0.00347	0.0208	0.0161	ND	0.00190	ND	0.0308
dup	09/20/01	0.0138	0.0564	ND	ND	0.00218	ND	ND	0.00110	ND	ND
	03/21/02	0.0177	0.0438	0.00823	0.00111	0.00533	0.00227	ND	ND	0.00100	0.0191
dup	03/21/01	0.0210	0.0489	0.00302	0.00142	0.00698	0.00458	ND	ND	ND	0.0220
	09/24/02	0.0126	0.0495	ND	ND	ND	ND	ND	0.00197	0.00126	ND
	03/20/03	0.0158	0.0483	ND	ND	ND	ND	ND	ND	ND	ND
dup*	03/20/03	0.0144	0.0486	ND	ND	ND	ND	ND	ND	ND	ND
	09/30/30	0.0238	0.193	0.0221	0.0195	0.0631	0.0392	ND	ND	ND	0.159
dup***	09/30/30	0.0267	0.276	0.0301	0.0268	0.0842	0.0574	ND	ND	ND	0.211
	03/29/04	0.0183	0.0529	0.00229	0.00106	0.00405	0.00330	<0.000200	<0.00100	<0.00100	0.00752



**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
 Willbridge Terminals  
 Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>B-32</b>	03/20/03	0.00367	0.0429	ND	0.00110	ND	ND	ND	ND	ND	ND
	09/29/03	0.122	6.84	0.0170	1.04	1.64	1.15	0.000754	0.0190	ND	3.74
	03/29/04	0.00917	0.434	0.00202	0.0615	0.108	0.0387	0.000221	0.0224	<0.00100	0.215
<b>B-33</b>	03/20/03	0.00483	0.0430	ND	0.00437	0.0114	0.0124	ND	ND	ND	0.0223
	09/30/03	0.0342	0.242	0.00699	0.0711	0.248	0.128	ND	0.00124	ND	0.385
	03/30/04	0.0155	0.199	0.00830	0.0451	0.164	0.110	<0.00200	<0.00100	<0.00100	0.389
<b>B-99</b>	09/24/02	0.0124	0.0501	ND	ND	ND	ND	ND	ND	ND	ND
<b>CR-1</b>	09/21/01	0.0143	0.0606	ND	0.00203	0.00468	0.00283	ND	0.00118	ND	0.00846
	03/21/02	0.00173	0.0188	ND	0.00113	0.00397	ND	ND	ND	ND	0.0163
	09/24/02	0.00204	0.0274	ND	ND	ND	ND	ND	ND	ND	0.00609
	03/20/03	0.0119	0.0300	ND	0.00156	0.0112	0.00211	ND	ND	ND	0.0179
	09/30/03	0.00832	0.0479	ND	0.00249	0.00836	0.00391	ND	0.00189	ND	0.0139
	03/30/04	0.00210	0.261	0.00583	0.0220	0.0535	0.0676	<0.000200	<0.00100	<0.00100	0.212
<b>CR-8</b>	02/18/00	0.0827	0.762	0.00345	0.0578	0.127	0.0997	ND	0.00321	0.00037	0.404
	05/23/00	0.0256	0.342	0.00312	0.0228	0.0684	0.0365	ND	0.00204	ND	0.155
	08/25/00	0.0203	0.105	ND	0.00697	0.0151	0.0101	ND	ND	ND	0.0442
	11/30/00	0.0167	0.0890	ND	0.00565	0.0149	0.00781	ND	0.00158	ND	0.0331
	02/22/01	0.0215	0.116	ND	0.00485	0.0123	0.00666	ND	ND	ND	0.0288
	05/16/01	0.0135	0.0374	ND	0.00128	0.00231	0.00147	ND	ND	ND	ND
<b>CR-9</b>	02/18/00	0.0167	0.236	0.00026	0.0194	0.0286	0.0156	ND	0.00187	0.0001	0.0769
	05/23/00	0.00298	0.0413	ND	0.003	0.00381	0.00188	ND	0.00112	ND	0.00893
	08/25/00	0.00160	0.0305	ND	ND	0.00143	ND	ND	ND	ND	ND
dup	08/25/00	0.00160	0.0305	ND	ND	0.00170	ND	ND	ND	ND	0.0165
	11/30/00	0.00162	0.0222	ND	ND	ND	ND	ND	0.00283	ND	0.00503
dup	11/30/00	ND	0.0222	ND	ND	ND	ND	ND	0.00114	ND	ND
	02/22/01	ND	0.0235	ND	ND	ND	ND	ND	ND	ND	ND
	05/16/01	0.00142	0.0291	ND	ND	0.00246	ND	ND	ND	ND	ND
	05/16/01	0.00145	0.0339	ND	0.00151	0.00205	ND	ND	ND	ND	ND
<b>CR-11</b>	02/18/00	0.0656	0.440	0.00559	0.0252	0.0571	0.0296	ND	0.00453	0.00014	0.123
	05/23/00	0.0493	0.382	0.00659	0.0358	0.0685	0.0391	ND	0.00321	ND	0.168
	08/25/00	0.0631	0.0834	ND	0.00101	0.00325	0.00137	ND	0.00183	ND	0.0179
	11/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/22/01	0.0536	0.126	ND	0.00104	0.00356	ND	ND	0.00324	ND	0.00784
	05/16/01	0.0587	0.111	ND	0.00362	0.00628	0.00314	ND	0.00243	ND	0.0193

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>KINDER MORGAN</b>											
<b>MW-8</b>	02/16/00	0.00974	0.0566	0.00073	0.00396	0.00476	0.00569	ND	ND	ND	0.0344
	05/31/00	0.00348	0.0226	ND	ND	ND	ND	ND	ND	ND	0.00788
	08/24/00	0.0136	0.0381	ND	ND	ND	ND	ND	ND	ND	0.00799
	12/01/00	0.0177	0.0710	0.00236	0.00195	0.00272	0.00250	ND	0.00239	ND	0.0207
	02/22/01	0.0111	0.0249	ND	0.00130	0.00234	ND	ND	ND	ND	0.00720
	05/16/01	0.00942	0.0308	ND	ND	0.00119	ND	ND	ND	ND	ND
dup	05/16/01	0.00931	0.0316	ND	ND	0.00135	ND	ND	ND	ND	0.0208
	09/21/01	0.0168	0.0637	0.00141	0.00219	0.00350	ND	ND	ND	ND	0.0138
	03/14/02	0.00198	0.0213	ND	ND	0.00376	ND	ND	ND	ND	0.00824
dup	03/14/02	0.00281	0.0220	ND	ND	0.00337	ND	ND	ND	ND	0.0115
	09/27/02	0.0116	0.0592	0.00130	0.00258	0.00514	0.00294	ND	ND	ND	0.0230
	03/18/03	0.00412	0.0408	ND	ND	NS	ND	ND	ND	ND	NS
dup	03/18/03	0.00352	0.0408	ND	ND	NS	ND	ND	ND	ND	NS
	09/24/03	0.01080	0.0281	ND	ND	ND	ND	ND	ND	ND	0.00670
	03/30/04	0.00150	0.0238	<0.00100	<0.00100	<0.00200	<0.00100	<0.000200	<0.00100	<0.00100	0.0107
	09/27/04	0.0160	0.0858	0.00268	0.00598	0.00898	0.00562	<0.000200	<0.00100	<0.00100	0.0613
dup	09/27/04	0.0167	0.110	0.00395	0.00454	0.0130	0.00705	<0.000200	<0.00100	<0.00100	0.0888
<b>MW-10</b>	02/16/00	0.0311	0.266	0.00027	0.025	0.0493	0.0256	ND	0.00045	0.00024	0.113
	05/31/00	0.0158	0.199	ND	0.0155	0.0292	0.0182	ND	0.00179	ND	0.0756
	08/24/00	0.0196	0.0518	ND	ND	ND	ND	ND	0.00130	ND	0.00549
	12/01/00	0.0284	0.0284	ND	0.00424	0.00704	0.00437	ND	0.00125	ND	0.0181
	02/22/01	0.0222	0.0670	ND	0.00169	0.00331	0.00102	ND	ND	ND	0.00893
	05/16/01	0.0199	0.0729	ND	ND	ND	ND	ND	ND	ND	ND
<b>MW-11</b>	02/16/00	0.0677	0.398	0.00018	0.0344	0.0672	0.0786	0.000065	0.00134	0.00015	0.168
	05/31/00	0.0595	0.454	ND	0.0291	0.0577	0.0705	0.000201	0.00296	ND	0.153
	08/24/00	0.0509	0.111	ND	0.00484	0.00828	0.0210	ND	0.00315	ND	0.0203
	12/01/00	0.0478	0.125	ND	0.00719	0.0114	0.0372	ND	0.00438	ND	0.0311
	02/22/01	0.0509	0.113	ND	0.00590	0.0110	0.0399	ND	ND	ND	0.0310
	05/16/01	0.0445	0.0816	ND	0.00184	0.00388	0.0300	ND	ND	ND	0.0158
<b>MW-13</b>	02/16/00	0.017	0.305	0.00011	0.0285	0.0438	0.0235	ND	0.00072	0.00016	0.130
	05/31/00	0.0115	0.411	ND	0.0264	0.0409	0.0228	ND	0.002	ND	0.114
	08/24/00	0.00331	0.0854	ND	0.00500	0.00817	0.00373	ND	0.00431	ND	0.0207
	12/01/00	0.00384	0.0784	ND	0.00494	0.00752	0.00139	ND	0.00146	ND	0.0201
dup	12/01/00	0.00465	0.0795	ND	0.00504	0.00682	0.00344	ND	0.00162	ND	0.0207
	02/22/01	0.00146	0.0621	ND	0.00409	0.00581	0.00237	ND	ND	ND	0.0176
	05/16/01	0.00174	0.0523	ND	0.00218	0.00308	0.00169	ND	ND	ND	0.0123

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>MW-15</b>	02/17/00	0.0017	0.0874	0.00004	0.00651	0.00546	0.00206	ND	0.00034	ND	0.0219
dup	02/17/00	0.00152	0.0877	0.00008	0.00655	0.00532	0.0034	-	0.00046	ND	0.021
	05/31/00	ND	0.0941	ND	0.006	0.00597	0.00322	ND	ND	ND	0.0298
	08/24/00	ND	0.141	ND	0.00989	0.00879	0.00420	ND	0.00481	ND	0.0388
	12/01/00	0.00316	0.148	ND	0.0133	0.0120	0.00697	ND	0.00115	ND	0.0534
	02/22/01	0.00129	0.108	ND	0.00840	0.00951	0.00664	ND	ND	ND	0.208
	05/16/01	ND	0.0681	ND	0.00126	0.00154	0.00113	ND	ND	ND	0.0246
<b>MW-21</b>	02/17/00	0.004	0.188	0.00219	0.00777	0.0091	0.00988	ND	0.00071	ND	0.0459
	05/30/00	0.00599	0.335	0.00701	0.0196	0.0248	0.0247	ND	0.00185	ND	0.126
	08/23/00	0.00339	0.185	ND	0.00202	0.00295	0.00126	ND	0.00153	ND	0.0140
	12/01/00	0.00344	0.141	0.00148	ND	ND	ND	ND	0.00176	ND	0.0140
	02/22/01	0.00350	0.184	ND	0.00117	ND	ND	ND	ND	ND	0.0107
	05/16/01	0.00471	0.0219	ND	ND	0.00127	0.00103	ND	ND	ND	0.0182
<b>MW-22</b>	02/17/00	0.0928	0.251	0.00017	0.0121	0.00834	0.0391	ND	0.00121	ND	0.0492
dup	02/17/00	-	-	-	-	-	-	ND	-	-	-
	05/30/00	0.0945	0.244	ND	0.0097	0.0095	0.0216	ND	0.00242	ND	0.0388
	08/23/00	0.104	0.194	ND	0.00125	0.00201	0.00695	ND	0.00274	ND	ND
	12/01/00	0.0831	0.295	ND	0.00199	0.00213	0.0105	ND	0.00300	ND	0.0265
	02/21/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/16/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
<b>MW-23</b>	02/17/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/30/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	08/23/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/30/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	02/22/01	0.00909	0.0582	ND	0.00175	0.00817	0.00441	ND	ND	ND	0.00983
	05/16/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
<b>MW-25</b>	09/21/01	0.0563	0.0958	ND	0.00339	0.00365	0.00411	ND	ND	ND	0.0258
	03/14/02	0.0406	0.115	ND	0.00573	0.00832	0.00969	ND	ND	0.00115	0.0278
	09/27/02	0.116	0.186	ND	0.00606	0.00897	0.00990	ND	ND	ND	0.0334
	03/18/03	0.0386	0.0440	ND	ND	NS	ND	ND	0.00115	0.00110	NS
	09/24/03	0.0661	0.181	0.00125	0.0144	0.0230	0.0201	ND	0.00179	ND	0.0712
	03/30/04	0.0521	0.0580	<0.00100	0.00157	<0.00200	<0.00115	<0.000200	<0.00100	<0.00100	0.00810
	09/27/04	0.0712	0.140	<0.00100	0.00506	0.0112	0.0112	<0.000200	<0.00100	<0.00100	0.0304

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>MW-26</b>	02/17/00	0.0474	0.0943	0.00005	0.00468	0.00368	0.00342	ND	0.0006	ND	0.0141
dup	02/17/00	0.0487	0.0904	0.0005	0.00434	0.00496	0.00312	ND	0.00033	ND	0.0422
	05/30/00	0.0443	0.102	ND	0.00453	0.00501	0.00492	ND	ND	ND	0.0162
	08/23/00	0.0530	0.0594	ND	0.00218	0.00249	0.00228	ND	ND	ND	ND
dup	08/23/00	0.0576	0.0642	ND	0.00227	0.00384	0.00228	ND	ND	ND	0.00791
	12/01/00	0.0526	0.0620	ND	0.00158	ND	0.00254	ND	0.00116	ND	0.00796
	02/21/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/17/01	0.0590	0.0678	ND	0.00221	0.00170	0.00225	ND	ND	ND	0.0120
	09/27/02	0.0450	0.0524	ND	0.00123	ND	0.00220	ND	ND	ND	0.0169
	03/18/03	0.0205	0.0670	ND	ND	NS	ND	ND	ND	0.00109	
	09/24/03	0.0510	0.0512	ND	ND	ND	0.00214	ND	ND	ND	0.00507
	03/30/04	0.0431	0.0661	<0.00100	<0.00100	<0.00100	0.00102	<0.000200	<0.00100	<0.00100	<0.00500
	09/27/04	0.0657	0.0662	<0.00100	0.00206	0.00448	0.00654	<0.000200	<0.00100	<0.00100	0.0188
<b>MW-28</b>	02/16/00	0.00032	0.00803	ND	0.00047	0.002	0.00387	ND	ND	ND	0.0172
	05/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	08/23/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	11/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/21/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/16/01	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
<b>MW-31</b>	02/16/00	0.00504	0.016	ND	0.00042	0.00222	0.00135	ND	ND	ND	0.00218
	05/30/00	0.00664	0.019	ND	ND	ND	ND	ND	ND	ND	ND
	08/23/00	0.0181	0.0200	ND	ND	ND	ND	ND	ND	ND	ND
	12/01/00	0.0134	0.0179	ND	ND	ND	0.00280	ND	ND	ND	ND
	02/22/01	0.0148	0.0228	ND	ND	ND	ND	ND	ND	ND	0.00723
	05/17/01	0.0150	0.0210	ND	ND	ND	0.00244	ND	ND	ND	0.0132
<b>MW-32</b>	02/16/00	0.00071	0.0189	0.00007	0.00297	0.00399	0.00309	ND	ND	ND	0.00603
	05/30/00	0.00147	0.0268	ND	0.00195	0.0043	0.00159	ND	ND	ND	0.0069
	08/23/00	ND	0.0147	ND	ND	0.00251	ND	ND	ND	ND	ND
	12/01/00	0.00193	0.0142	ND	ND	ND	ND	ND	0.00120	ND	ND
	02/22/01	ND	0.00921	ND	0.00119	ND	ND	ND	ND	ND	ND
	05/16/01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
 Willbridge Terminals  
 Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>MW-33</b>	02/16/00	0.00842	0.0768	0.00006	0.00162	0.00423	0.00368	ND	ND	ND	0.00746
	05/30/00	0.00655	0.111	ND	0.00179	0.00338	0.00154	ND	ND	ND	0.00721
	08/24/00	0.0103	0.227	ND	0.00104	0.00246	ND	ND	0.00259	ND	ND
	11/30/00	0.0580	0.563	ND	0.00223	0.00343	ND	ND	0.00163	ND	0.00882
	02/22/01	0.0142	0.0910	ND	0.00179	0.00339	0.00103	ND	ND	ND	0.00944
dup	02/22/01	0.0142	0.104	ND	0.00188	0.00390	0.00155	ND	ND	ND	0.0110
	05/16/01	0.0178	0.184	ND	ND	0.00128	ND	ND	ND	ND	ND
	09/21/01	0.0100	0.0757	ND	ND	ND	ND	ND	0.00151	ND	ND
	03/14/02	0.00975	0.0722	ND	ND	ND	ND	ND	ND	0.00202	ND
	09/27/02	0.0302	0.356	ND	0.00206	0.00303	0.00136	ND	ND	ND	0.0205
	03/18/03	0.00867	0.0401	ND	ND	NS	ND	ND	ND	0.00140	NS
	09/24/03	0.0232	0.191	ND	ND	ND	ND	ND	ND	ND	ND
	03/29/04	0.0124	0.0552	<0.00100	0.00114	<0.00200	<0.00100	<0.000200	<0.00100	<0.00100	<0.00500
	09/27/04	0.132	1.41	<0.00200	0.00628	0.0135	<0.00200	0.000490	<0.00200	<0.00200	0.0319
<b>MW-34</b>	09/21/01	0.0697	0.381	0.00239	0.0143	0.144	0.0146	ND	0.00146	ND	0.104
	03/14/02	0.0376	0.178	ND	0.00582	0.0132	0.00549	ND	ND	0.00151	0.0321
	09/27/02	0.162	0.670	0.00164	0.0264	0.0676	0.0226	ND	0.00130	ND	0.126
	03/18/03	0.0148	0.0934	ND	0.00602	NS	0.00541	ND	ND	0.00113	NS
	09/24/03	0.0109	0.0654	ND	0.00106	0.00236	0.00117	ND	ND	ND	0.00994
	03/29/04	0.00364	0.0350	<0.00100	0.00114	<0.00200	<0.00100	<0.000200	<0.00100	<0.00100	<0.00500
	09/27/04	0.0879	0.355	<0.00100	0.0114	0.0285	0.0111	<0.000200	0.00131	<0.00100	0.0547
<b>MW-36</b>	02/16/00	0.0146	0.0575	0.00005	0.00413	0.00614	0.00355	ND	0.00022	ND	0.0131
	05/31/00	0.0149	0.0512	ND	0.0018	0.00308	ND	ND	ND	ND	ND
	08/24/00	0.0187	0.0570	ND	ND	0.00222	ND	ND	0.00111	ND	0.0108
	11/30/00	0.0225	0.0701	ND	ND	ND	ND	ND	0.00147	ND	ND
	02/21/01	0.0201	0.0560	ND	0.00151	0.00280	ND	ND	ND	ND	0.00677
	05/16/01	0.0297	0.0826	ND	ND	0.0169	ND	ND	ND	ND	0.0149
	09/21/01	0.0168	0.0541	ND	ND	ND	ND	ND	0.00108	ND	ND
	03/13/02	0.00442	0.0252	ND	ND	0.00297	ND	ND	ND	ND	0.0122
	03/18/03	0.00541	0.0316	ND	0.00122	NS	ND	ND	ND	ND	NS
	09/24/03	0.0436	0.116	ND	0.00103	0.00234	ND	ND	ND	ND	ND
	3/29/04	0.0108	0.0339	<0.00100	0.00131	0.00385	0.00144	<0.000200	<0.00100	<0.00100	<0.00500
	9/27/2004	0.0320	0.0679	<0.00100	0.00238	0.00739	0.00334	<0.000200	0.00140	<0.00100	0.00675

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
 Willbridge Terminals  
 Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>MW-37</b>	02/16/00	0.0184	0.0748	0.00022	0.00721	0.0118	0.00469	ND	0.00032	ND	0.0184
	05/30/00	0.0199	0.0567	ND	0.00356	0.00572	0.0018	ND	0.00158	ND	0.0111
dup	05/30/00	0.0189	0.0586	ND	0.00408	0.00637	0.00205	ND	ND	ND	0.0121
	08/24/00	0.0227	0.0453	ND	ND	ND	ND	ND	0.00158	ND	0.00598
	11/30/00	0.0221	0.0693	ND	0.00419	0.00605	0.00353	ND	0.00123	ND	0.0123
	02/21/01	0.0223	0.0404	ND	0.00153	0.00206	ND	ND	ND	ND	0.00526
	05/16/01	0.0209	0.0403	ND	ND	ND	ND	ND	ND	ND	ND
	09/21/01	0.0222	0.0432	ND	0.00127	ND	0.00147	ND	ND	ND	ND
	09/27/02	0.0190	0.0429	ND	ND	ND	ND	ND	ND	ND	ND
dup	09/27/02	0.0194	0.0423	ND	ND	ND	ND	ND	ND	ND	0.00923
	03/18/03	0.00864	0.0259	ND	ND	NS	ND	ND	ND	0.00141	NS
	09/03/04										
	03/30/04										
	09/27/04	0.0242	0.0679	<0.00100	0.00308	0.00565	0.00334	<0.000200	<0.00100	<0.00100	0.0181
<b>MW-39</b>	03/29/04	0.0174	0.110	<0.00100	0.00988	0.0163	0.00823	<0.000200	<0.00100	<0.00100	0.0346
	09/27/04	0.0304	0.281	<0.00100	0.0248	0.0832	0.0190	<0.000200	0.00140	<0.00100	0.113
<b>MW-40</b>	02/16/00	0.0221	0.185	0.00011	0.0202	0.0289	0.0254	ND	0.00047	0.00012	0.0669
	05/30/00	0.025	0.107	ND	0.00783	0.0107	0.00837	ND	ND	ND	0.0245
	08/24/00	0.0270	0.123	ND	0.00162	0.00316	0.00141	ND	0.00385	ND	0.0160
	11/30/00	0.0319	0.144	ND	0.00433	0.00734	0.00491	ND	0.00187	ND	0.0178
	02/21/01	0.0387	0.119	ND	0.00375	0.00607	0.00330	ND	ND	ND	0.0183
	05/16/01	0.0239	0.102	ND	0.00224	0.00314	0.00193	ND	ND	ND	0.00862
	09/21/01	0.0248	0.106	ND	0.00306	0.00343	0.00254	ND	0.00232	ND	0.0107
	03/13/02	0.0126	0.0538	ND	0.00197	0.00336	0.00194	ND	ND	ND	0.0124
	09/27/02	0.0281	0.219	ND	0.00881	0.0104	0.00808	ND	ND	ND	0.0250
	03/18/03	0.0174	0.0485	ND	0.00135	NS	0.00130	ND	ND	ND	NS
	09/24/03	0.0448	0.254	ND	0.00895	0.0131	0.0316	ND	ND	ND	0.0326
dup	09/24/03	0.0678	0.397	ND	0.0179	0.0249	0.0538	ND	ND	ND	0.0627
	03/29/04	0.0190	0.0897	<0.00100	0.00124	0.00264	0.00124	<0.000200	<0.00100	<0.00100	<0.00500
dup	03/29/04	0.0178	0.0797	<0.00100	0.00719	<0.00200	0.00128	<0.000200	<0.00100	<0.00100	<0.00500
	9/27/2004	0.0611	0.343	<0.00100	0.0179	0.0293	0.0308	<0.000200	<0.00100	<0.00100	0.0764

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>CONOCOPHILLIPS</b>											
<b>B-4</b>	05/26/00	0.035	0.245	ND	0.0275	0.0425	0.014	ND	ND	ND	0.075
dup	05/26/00	0.0367	0.259	ND	0.0283	0.0443	0.0147	ND	ND	ND	0.0785
	08/28/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/29/00	0.0316	0.106	ND	0.00532	0.00968	0.00285	ND	0.00165	ND	0.0176
	02/20/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	09/26/02	0.0308	0.0999	ND	0.00541	0.00885	0.00272	ND	0.00129	ND	0.0259
	09/25/03	0.0316	0.0928	ND	0.00258	0.00497	0.00155	ND	0.00129	ND	0.0147
<b>B-17</b>	02/17/00	0.0579	0.549	0.00036	0.091	0.140	0.0676	ND	0.00152	0.00028	0.215
	05/26/00	0.0509	0.195	ND	0.0191	0.029	0.0171	ND	0.00126	ND	0.0485
	08/28/00	0.0532	0.113	ND	0.00279	0.00417	0.00660	ND	ND	ND	0.0120
	11/29/00	0.0525	0.111	ND	0.00217	0.00695	0.00636	ND	0.00220	ND	0.00979
	02/23/01	0.0519	0.0821	ND	0.00130	0.00302	0.00470	ND	ND	ND	0.00966
dup	02/23/01	0.0511	0.0885	ND	0.00305	0.00691	0.00535	ND	0.00119	ND	0.0143
	05/17/01	0.0656	0.125	ND	0.00518	0.00746	0.00812	ND	ND	ND	0.0287
dup	05/17/01	0.0650	0.114	ND	0.00406	0.00546	0.00718	ND	0.00126	ND	0.0150
<b>B-18</b>	02/17/00	0.0223	0.507	0.00044	0.0797	0.110	0.0293	0.000098	0.00158	0.00022	0.174
	05/26/00	0.0228	0.203	ND	0.0211	0.0313	0.00922	ND	ND	ND	0.0558
	08/28/00	0.0221	0.130	0.00111	0.00563	0.00684	0.00315	ND	ND	ND	0.0270
	11/29/00	0.0171	0.128	ND	0.00238	0.00451	0.00120	ND	0.00153	ND	0.0157
	02/23/01	0.0256	0.118	ND	0.00538	0.0107	0.00294	ND	ND	ND	0.0506
	05/17/01	0.0372	0.138	ND	0.00774	0.00959	0.00310	ND	0.00106	0.00101	0.0309
<b>B-22</b>	02/17/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/26/00	0.0255	0.126	ND	0.0105	0.0187	0.00561	ND	ND	ND	0.0385
	08/28/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/29/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/20/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>B-35</b>	02/17/00	0.0602	0.480	0.00062	0.0893	0.122	0.0828	ND	0.00164	0.00021	0.311
	05/26/00	0.0102	0.116	ND	0.00786	0.0114	0.00264	ND	0.0013	ND	0.0233
	08/28/00	0.0377	0.128	0.00153	0.00467	0.00612	0.00643	ND	ND	ND	0.0339
	11/29/00	0.0468	0.131	ND	0.00316	0.00691	0.00619	ND	0.00212	ND	0.0208
	02/23/01	0.0347	0.0816	ND	0.00200	0.00380	0.00305	ND	0.00100	ND	0.0308
	05/17/01	0.0504	0.153	ND	0.0107	0.0141	0.0106	ND	ND	ND	0.0511
	09/20/01	0.0344	0.0901	ND	0.00178	0.00420	0.00160	ND	ND	ND	0.00632
	03/14/02	0.0335	0.308	ND	0.0463	0.0534	0.0298	ND	0.00139	0.00145	0.146
	09/26/02	0.0296	0.225	ND	0.0298	0.0314	0.0147	ND	0.00131	ND	0.0816
	03/18/03	0.0387	0.0958	ND	0.00155	0.00422	0.00277	ND	ND	ND	0.00700
	09/25/03	0.0517	0.132	ND	0.00334	0.00631	0.00536	ND	ND	ND	0.0171
	3/30/04	0.0291	0.135	<0.00100	0.0119	0.0149	0.00779	<0.000200	<0.00100	<0.00100	0.0152
	9/28/04	0.0422	0.182	<0.00100	0.00829	NA	0.00993	0.00171	<0.00100	<0.00100	NA
<b>B-36</b>	02/17/00	0.0105	0.168	0.00021	0.0222	0.0306	0.00779	ND	0.00064	ND	0.0551
	05/26/00	0.0105	0.120	ND	0.00819	0.012	0.00251	ND	ND	ND	0.025
	08/28/00	0.0224	0.156	ND	0.00784	0.00876	0.00322	ND	ND	ND	0.0474
	11/29/00	0.0223	0.130	ND	0.00525	0.00834	0.00171	ND	0.00202	ND	0.0171
	02/23/01	0.0488	0.174	ND	0.00371	0.00666	0.00142	ND	0.00234	ND	0.0244
	05/17/01	0.0387	0.476	ND	0.05720	0.06960	0.01650	ND	0.00301	ND	0.138
	09/20/01	0.0185	0.0861	ND	0.00154	0.00302	ND	ND	ND	ND	0.00761
dup	09/20/01	0.0204	0.0974	ND	0.00294	0.00411	ND	ND	ND	ND	0.0132
	03/14/02	0.00840	0.0901	ND	0.00874	0.0114	0.00271	ND	ND	ND	0.0294
	09/26/02	0.0170	0.109	ND	0.00688	0.00910	0.00440	ND	ND	ND	0.0334
	03/18/03	0.00402	0.0409	ND	0.00234	0.00393	0.00144	ND	ND	ND	0.00729
	09/25/03	0.0200	0.0644	ND	ND	ND	ND	ND	0.00105	ND	ND
	03/30/04	0.00719	0.0586	<0.00100	0.00313	0.00580	0.00149	<0.000200	<0.00100	<0.00100	0.0152
	09/28/04	0.0233	0.112	<0.00100	0.00349	NA	0.00120	0.000285	<0.00100	<0.00100	NA
dup	09/28/04	0.0221	0.0814	<0.00100	0.00222	NA	<0.00100	<0.000200	<0.00100	<0.00100	NA



**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
 Willbridge Terminals  
 Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>B-37</b>	02/17/00	0.369	0.152	0.00033	0.0159	0.0297	0.00705	ND	0.00159	ND	0.0544
dup	02/17/00	0.327	0.0344	0.0004	0.00066	0.00145	0.00236	ND	0.00025	ND	0.00159
	05/26/00	0.418	0.092	ND	0.00526	0.0131	0.00234	ND	ND	ND	0.0215
	08/28/00	0.897	0.227	ND	0.00462	0.00938	0.00209	ND	ND	ND	0.0303
	11/29/00	0.391	0.0990	ND	0.00221	0.00608	ND	ND	0.00132	ND	0.0120
	02/23/01	0.198	0.0747	ND	ND	0.00339	ND	ND	ND	ND	0.0170
	05/17/01	0.521	0.168	ND	0.00408	0.00984	0.00164	ND	ND	ND	0.0355
	03/14/02	0.0869	0.252	ND	0.0170	0.0409	0.00746	ND	ND	ND	0.0764
	09/26/02	0.117	0.119	ND	0.00603	0.0100	0.00625	ND	ND	ND	0.0348
	03/18/03	0.0758	0.121	ND	0.00829	0.0178	0.00429	ND	ND	0.00222	0.0539
dup	03/18/03	0.0683	0.0958	ND	0.00572	0.0115	0.00288	ND	ND	0.00141	0.0364
	09/25/03	0.260	0.158	ND	0.00290	0.00853	0.00119	ND	0.00169	ND	0.0215
dup	09/25/03	0.247	0.182	ND	0.00513	0.0143	0.00217	ND	ND	ND	0.0330
	03/31/04	0.125	0.0546	<0.00100	0.00137	0.00454	0.00131	<0.000200	<0.00100	<0.00100	0.00842
	09/28/04	0.131	0.0784	<0.00100	0.00218	NA	<0.00100	<0.000200	<0.00100	<0.00100	NA
<b>B-40</b>	02/17/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	05/26/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	08/28/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/29/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	02/20/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
<b>U-2</b>	02/17/00	0.0186	0.0632	0.00023	0.00363	0.0116	0.00499	ND	0.00034	ND	0.0241
	05/26/00	0.011	0.0503	ND	0.00137	0.00537	0.00145	ND	ND	ND	0.0109
	08/28/00	0.0119	0.0503	0.00120	0.00109	0.00377	0.00169	ND	ND	ND	0.0147
	11/29/00	0.00729	0.0499	ND	0.00158	0.00314	0.00109	ND	0.00105	ND	0.0131
	02/23/01	0.00887	0.0373	ND	ND	0.00935	0.00173	ND	ND	ND	0.0212
	05/17/01	0.00953	0.0427	ND	0.00129	0.00916	0.00257	ND	ND	ND	0.0205
	09/20/01	0.00680	0.0397	ND	ND	0.00421	ND	ND	ND	ND	0.00700
	03/14/02	0.0108	0.0534	ND	0.00168	0.00666	0.00183	ND	ND	ND	0.0436
	09/26/02	0.00678	0.0443	ND	ND	0.00277	ND	ND	0.00127	ND	0.0116
	03/18/03	0.00998	0.0487	ND	0.00100	0.00583	0.00111	ND	ND	ND	0.0398
	09/25/03	0.00978	0.0749	ND	0.00658	0.00896	0.00268	ND	ND	ND	0.0636
	03/31/04	0.0158	0.0646	<0.00100	0.00243	0.0107	0.00313	<0.000200	0.00116	<0.00100	0.0500
	09/28/04	0.0111	0.0762	<0.00100	0.00318	NA	0.00282	<0.000200	<0.00100	<0.00100	NA

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>U-3</b>	02/17/00	0.0421	0.194	0.00023	0.0241	0.0171	0.0225	ND	0.00102	ND	0.268
	05/26/00	0.040	0.171	ND	0.0149	0.0116	0.0182	ND	0.00145	ND	0.139
	08/28/00	0.0365	0.124	ND	0.00704	0.00673	0.0212	ND	0.00202	ND	0.103
	11/29/00	0.0428	0.170	ND	0.00994	0.00949	0.0167	ND	0.00342	ND	0.107
dup	11/29/00	0.0413	0.172	ND	0.00996	0.00932	0.0149	ND	0.00284	ND	0.0973
	02/23/01	0.119	0.631	ND	0.170	0.107	303	ND	ND	ND	1.47
	05/17/01	0.0450	0.111	ND	0.00359	0.00439	0.00427	ND	0.00170	ND	0.0258
<b>U-4</b>	05/26/00	0.0188	0.101	ND	0.00367	0.00749	0.00268	ND	ND	ND	0.0149
	08/28/00	0.0198	0.0930	ND	ND	0.00214	0.00129	ND	ND	ND	0.0150
dup	08/28/00	0.0189	0.0922	ND	ND	0.00299	0.00131	ND	ND	ND	0.0157
	11/29/00	0.0198	0.0911	ND	ND	ND	ND	ND	0.00194	ND	0.00895
	02/23/01	0.0216	0.0802	ND	ND	ND	ND	ND	ND	ND	0.00587
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	09/26/02	0.0183	0.106	ND	0.00432	0.0105	0.00484	ND	0.00180	ND	0.0377
dup	09/26/02	0.0183	0.106	ND	0.00403	0.00976	0.00379	ND	0.00128	ND	0.0313
<b>U-5</b>	02/17/00	0.0127	0.164	0.00094	0.0175	0.0456	0.0189	ND	0.00095	ND	0.933
	05/26/00	0.0104	0.0748	ND	0.00225	0.00912	0.0037	ND	ND	ND	0.286
	08/28/00	0.0109	0.219	ND	0.00759	0.0216	0.0143	ND	0.00165	ND	0.884
	11/29/00	0.0123	0.124	ND	0.00547	0.0216	0.00856	ND	0.00216	ND	0.825
	02/23/01	0.0126	0.101	ND	0.00692	0.0345	0.0140	ND	0.00100	ND	1.17
	05/17/01	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	03/18/03	0.0110	0.170	ND	0.0129	0.0663	0.0158	ND	ND	0.00323	2.59
	09/25/03	0.0126	0.102	ND	0.00736	0.0201	0.00947	ND	0.00118	ND	0.800
	03/31/04	0.00802	0.0852	<0.00100	0.00758	0.0230	0.0115	<0.000200	<0.00100	<0.00100	0.785
	09/28/04	0.00987	0.103	<0.00100	0.00623	NA	0.0106	0.000228	<0.00100	<0.00100	NA
<b>U-10</b>	03/18/03	0.107	3.39	ND	0.313	0.403	0.176	0.000551	ND	ND	1.22
	09/25/03	0.00975	0.196	ND	0.0132	0.0149	0.00904	ND	ND	ND	0.0493
	03/30/04	0.0316	0.128	<0.00100	0.00481	0.00573	0.0225	<0.000200	<0.00100	<0.00100	0.0288
	09/28/04	0.00657	0.201	<0.00100	0.00966	NA	0.00852	<0.000200	<0.00100	<0.00100	NA

**TABLE 4**  
**GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Willbridge Terminals  
Portland, Oregon

Sample I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>U-11</b>	03/18/03	0.00942	0.372	ND	0.0297	0.0339	0.0336	0.000211	0.00153	ND	0.110
	09/25/03	0.0343	0.0893	ND	0.00220	0.00287	0.00830	ND	0.00101	ND	0.0124
	03/30/04	0.00679	0.363	<0.00100	0.0341	0.312	0.0212	<0.000200	0.00165	<0.00100	0.103
dup	03/30/04	0.0357	0.108	<0.00100	0.00400	0.00594	0.0201	<0.000200	<0.00100	<0.00100	0.0292
	09/28/04	0.0106	0.534	<0.00100	0.05610	NA	0.0684	0.000472	0.00192	<0.00100	NA
<b>U-12</b>	03/18/03	0.0323	0.136	ND	0.00600	0.00711	0.0228	ND	ND	ND	0.0338
	09/25/03	0.0418	1.91	ND	0.362	0.372	0.302	0.000559	0.00480	ND	1.2
	03/30/04	0.00655	0.248	<0.00100	0.0179	0.0233	0.0220	<0.000200	0.00185	<0.00100	0.0728
	09/28/04	0.0369	0.208	<0.00100	0.0102	NA	0.0499	<0.000200	<0.00100	<0.00100	NA
<b>P-1</b>	03/17/03	0.0225	1.27	ND	0.216	0.239	0.0946	0.000604	ND	ND	0.625
	03/31/04	0.0527	4.37	<0.0100	0.642	0.848	0.244	0.000816	<0.0100	<0.0100	1.73
<b>P-2</b>	03/17/03	0.0111	0.0783	ND	0.00232	0.00722	0.00288	ND	ND	0.00106	0.00979
	9/25/03 <sup>1</sup>	0.00966	0.116	ND	0.00443	0.0116	0.00553	ND	0.00109	ND	0.0137
	03/30/04	0.00805	0.131	<0.00100	0.00187	0.00447	0.00126	<0.000200	<0.00100	<0.00100	0.0123
	09/28/04	0.0103	0.163	<0.00100	0.00570	NA	0.00742	0.000214	0.00103	<0.00100	NA

**NOTES:**

ND - Not detected at laboratory reporting limits

NS/F = Not sampled floating product present

NS/S = Not sampled sheen present

2/00 and 5/00 data from IT Corporation

8/00, 11/00, 2/01 and 5/01 data from KHM Environmental Management, Inc.

Sample locations are shown on Figure 2

Analytical Reports are included in Attachment B

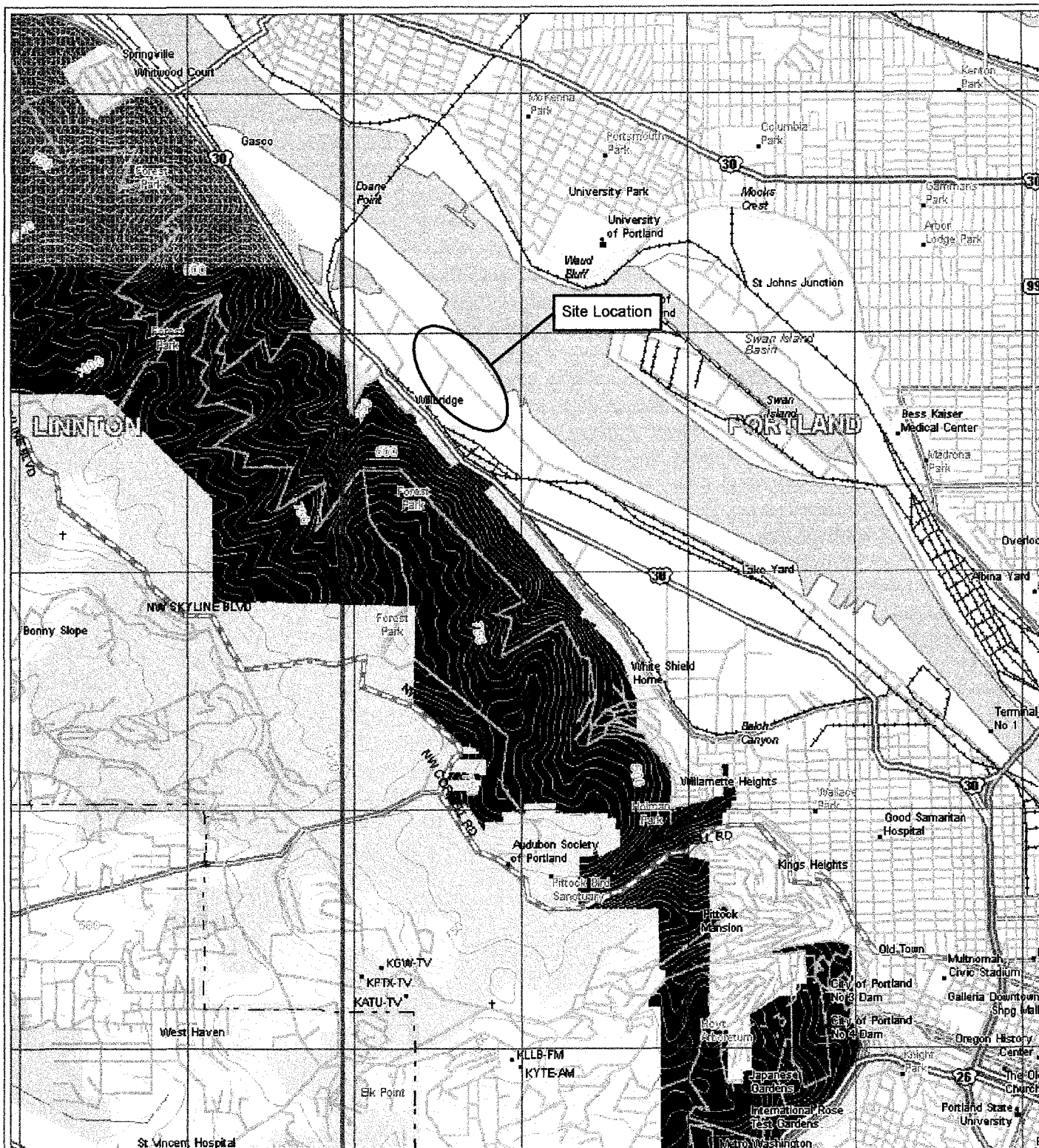
dup\* = duplicate for B-30 submitted as blind duplicate labeled as B-50

dup\*\*= duplicate for B-30 submitted as blind duplicate labeled as B-31

dup\*\*\*= duplicate for B-30 submitted as blind duplicate labeled as B-130

<sup>1</sup> = Sample ID was misidentified by the laboratory as D-2

Total Metals Analysis by EPA 6000/7000 Series Methods



## REFERENCES

USGS 7.5 Minute Topographic Maps  
Portland, Oregon-Washington  
Linnton, Oregon  
DeLorme TopoQuads, 1999  
SCALE: 1 inch = 3750 feet

North

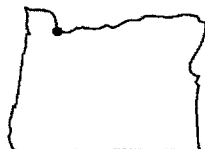


FIGURE 1

## SITE LOCATION MAP

Willbridge Petroleum Terminals  
Portland, Oregon

PROJECT NO.  
PTWB-01A  
FILE NO.  
PTWB-01A  
REVISION NO.  
1

DRAWN BY  
KNT 6-12-03  
PREPARED BY  
NWH 4-15-4  
REVIEWED BY



**Delta**  
Environmental  
Consultants, Inc.

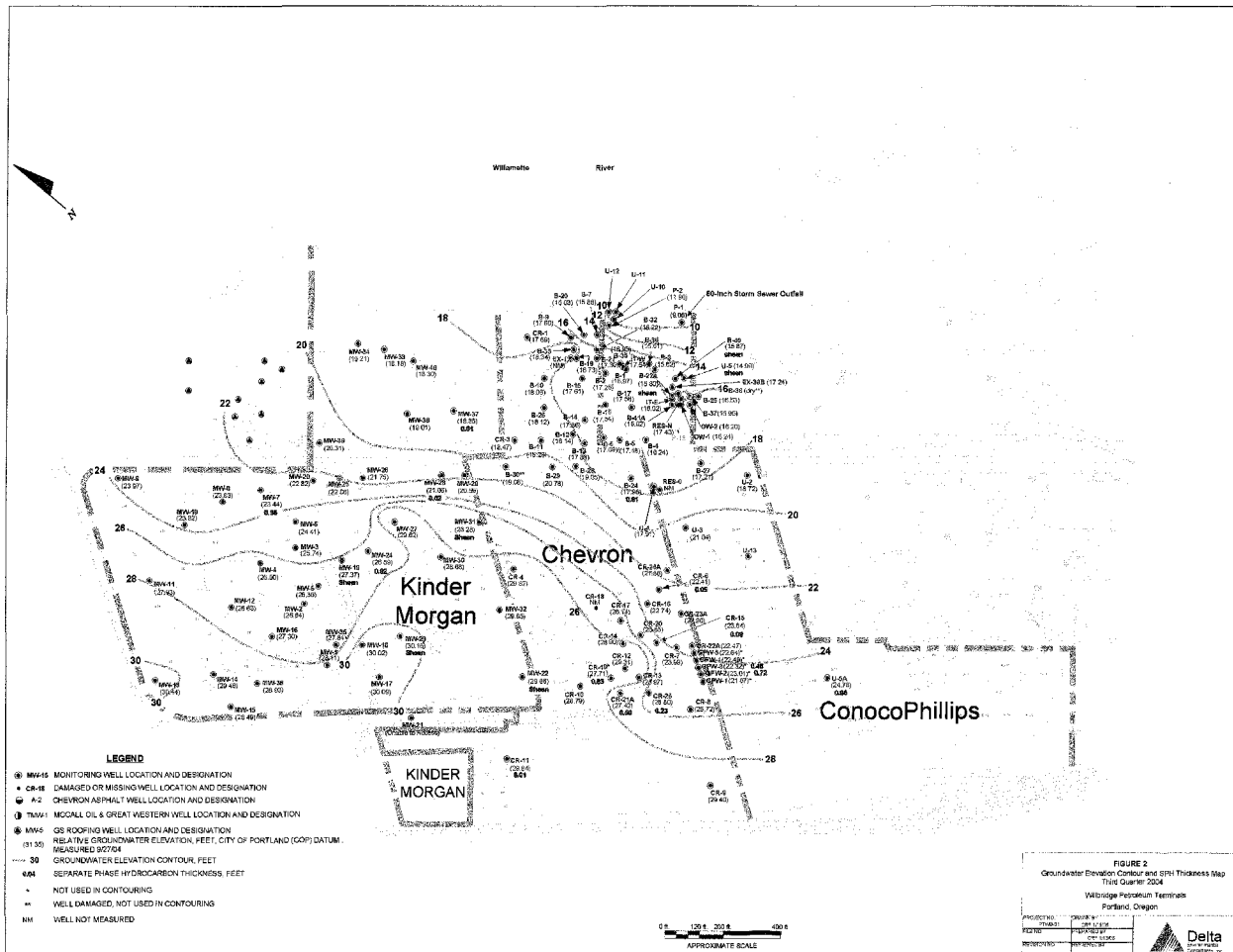
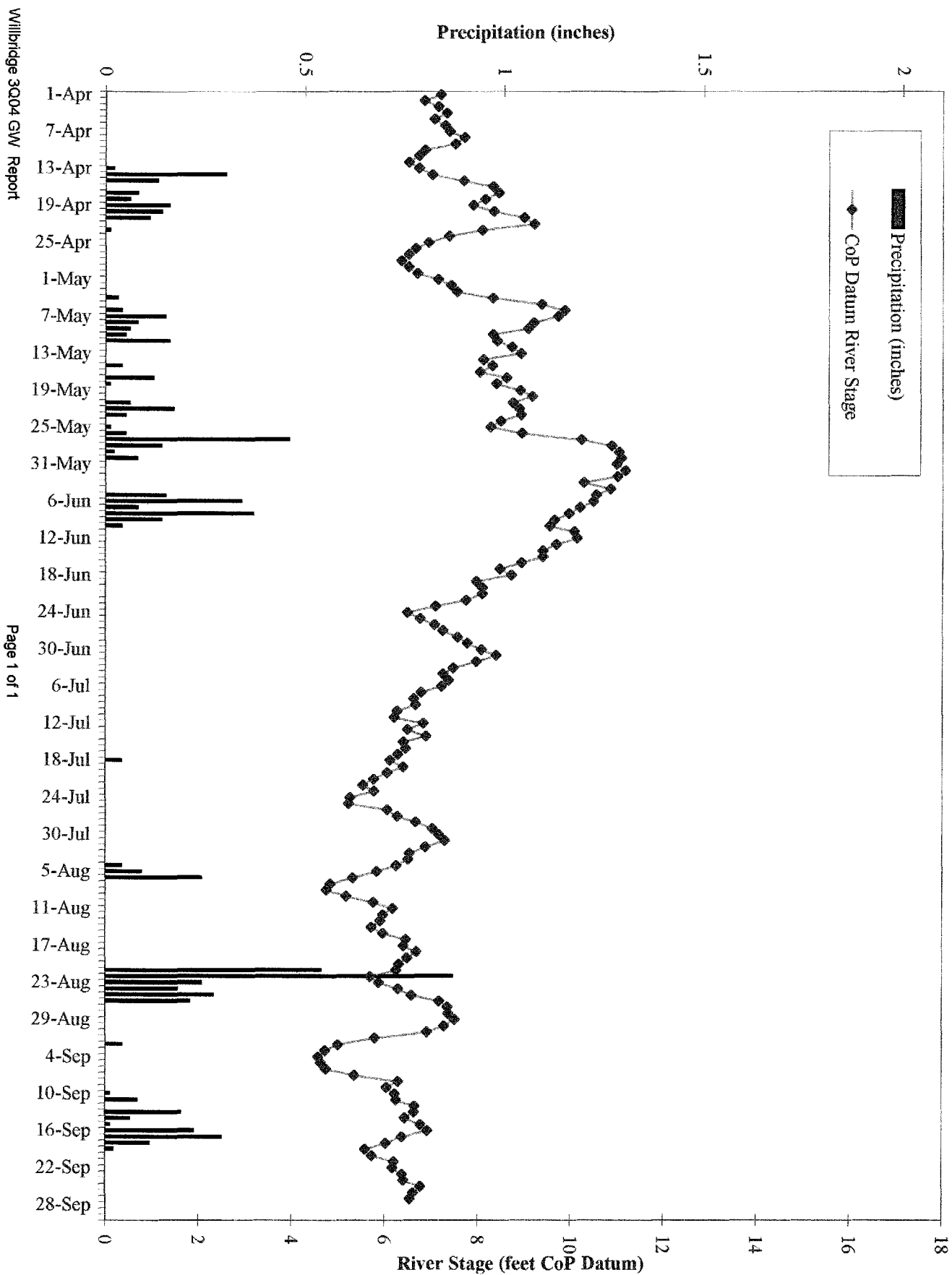


FIGURE 3  
**PRECIPITATION AND RIVER STAGE**  
 April - September 2004  
 Willbridge Facility



## **APPENDIX A**

---

### **GROUNDWATER MONITORING AND SAMPLING PROCEDURES, CERTIFIED ANALYTICAL LABORATORY REPORTS AND CHAIN- OF-CUSTODY DOCUMENTATION**

## **Groundwater Monitoring and Sampling**

Before the sampling event, Delta measured depth to water in each groundwater monitoring well at the facility with a Solinst Electronic Oil/Water Interface Probe. This information was recorded on waterproof field sheets. Groundwater elevations (GWE) were measured to an accuracy of 0.01 feet. Wells were sampled after purging three casing volumes of water from the well (or until dry). Wells with observable amounts of SPH were not sampled. After the well had recharged to approximately 80% of static level, samples were collected using a disposable polyethylene bailer and placed in the appropriate laboratory-provided containers. Samples were labeled, placed into ice filled coolers, logged onto chain-of-custody forms and transported to the laboratory.





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October 20, 2004

Gerry Koschal  
SAIC  
1220 SW Morrison Suite 500  
Portland, OR 97205

RE: CVX Willbridge / Chevron #100-1868

Enclosed are the results of analyses for samples received by the laboratory on 10/06/04 14:12.  
The following list is a summary of the NCA Work Orders contained in this report.  
If you have any questions concerning this report, please feel free to contact me.

<u>Work</u>	<u>Project</u>	<u>ProjectNumber</u>
P4J0284	CVX Willbridge / Chevron #100-	N/A

Thank You,

Sarah Passarge, Project Manager

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**Environmental Laboratory Network**

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<b>SAIC</b> 1220 SW Morrison Suite 500 Portland, OR 97205	Project Name: <b>CVX Willbridge / Chevron #100-1868</b> Project Number: N/A Project Manager: Gerry Koschal	Report Created: 10/20/04 18:38
---	--	-----------------------------------

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
CR-1	P4J0284-01	Water	10/06/04 12:15	10/06/04 14:12
B-9	P4J0284-02	Water	10/06/04 11:30	10/06/04 14:12
B-10	P4J0284-03	Water	10/06/04 11:55	10/06/04 14:12
B-21	P4J0284-04	Water	10/06/04 12:25	10/06/04 14:12
B-29	P4J0284-05	Water	10/06/04 08:40	10/06/04 14:12
B-30	P4J0284-06	Water	10/06/04 09:20	10/06/04 14:12
B-30-DUP	P4J0284-07	Water	10/06/04 08:00	10/06/04 14:12
TB-LB80	P4J0284-08	Water	10/06/04 08:40	10/06/04 14:12

North Creek Analytical - Portland

*Sarah Essarge*

Sarah Essarge, Project Manager

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: N/A

Project Manager: Gerry Koschal

Report Created:

10/20/04 18:38

**Total Metals per EPA 6000/7000 Series Methods**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4J0284-01</b>	<b>Water</b>			<b>CR-1</b>					<b>Sampled: 10/06/04 12:15</b>	
Arsenic	EPA 6020	0.00211	----	0.00100	mg/l	1x	4100414	10/08/04	10/16/04 16:00	
Barium	"	0.0286	----	0.00100	"	"	"	"	"	
Cadmium	"	ND	----	0.00100	"	"	"	"	"	
Chromium	"	ND	----	0.00100	"	"	"	"	"	
Copper	"	ND	----	0.00200	"	"	"	"	"	
Lead	"	ND	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	0.00126	----	0.000200	"	"	4100492	10/11/04	10/11/04 15:35	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100414	10/08/04	10/16/04 16:00	
Silver	"	ND	----	0.00100	"	"	"	"	"	
Zinc	"	ND	----	0.00500	"	"	"	"	"	
<b>P4J0284-02</b>	<b>Water</b>			<b>B-9</b>					<b>Sampled: 10/06/04 11:30</b>	
Arsenic	EPA 6020	0.0155	----	0.00100	mg/l	1x	4100414	10/08/04	10/16/04 16:09	
Barium	"	0.0499	----	0.00100	"	"	"	"	"	
Cadmium	"	ND	----	0.00100	"	"	"	"	"	
Chromium	"	ND	----	0.00100	"	"	"	"	"	
Copper	"	0.00218	----	0.00200	"	"	"	"	"	
Lead	"	0.00110	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	0.000584	----	0.000200	"	"	4100492	10/11/04	10/11/04 15:39	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100414	10/08/04	10/16/04 16:09	
Silver	"	ND	----	0.00100	"	"	"	"	"	
Zinc	"	0.0195	----	0.00500	"	"	"	"	"	

North Creek Analytical - Portland

Sarah Rssarge, Project Manager

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**SAIC**

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Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: N/A

Project Manager: Gerry Koschal

Report Created:

10/20/04 18:38

**Total Metals per EPA 6000/7000 Series Methods**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4J0284-03	Water			B-10					Sampled: 10/06/04 11:55	
Arsenic	EPA 6020	0.0368	----	0.00100	mg/l	1x	4100414	10/08/04	10/16/04 16:18	
Barium	"	0.0729	----	0.00100	"	"	"	"	"	
Cadmium	"	ND	----	0.00100	"	"	"	"	"	
Chromium	"	ND	----	0.00100	"	"	"	"	"	
Copper	"	ND	----	0.00200	"	"	"	"	"	
Lead	"	0.00236	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	0.000815	----	0.000200	"	"	4100492	10/11/04	10/11/04 15:42	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100414	10/08/04	10/16/04 16:18	
Silver	"	ND	----	0.00100	"	"	"	"	"	
Zinc	"	0.00662	----	0.00500	"	"	"	"	"	
P4J0284-04	Water			B-21					Sampled: 10/06/04 12:25	
Arsenic	EPA 6020	0.0559	----	0.00100	mg/l	1x	4100414	10/08/04	10/16/04 16:27	
Barium	"	0.101	----	0.00100	"	"	"	"	"	
Cadmium	"	ND	----	0.00100	"	"	"	"	"	
Chromium	"	0.00132	----	0.00100	"	"	"	"	"	
Copper	"	0.00221	----	0.00200	"	"	"	"	"	
Lead	"	0.00121	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	0.000665	----	0.000200	"	"	4100492	10/11/04	10/11/04 15:46	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100414	10/08/04	10/19/04 15:11	
Silver	"	ND	----	0.00100	"	"	"	"	10/16/04 16:27	
Zinc	"	0.00689	----	0.00500	"	"	"	"	"	

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Project Name **CVX Willbridge / Chevron #100-1868**

Project Number: N/A

Project Manager: Gerry Koschal

Report Created:

10/20/04 18:38

**Total Metals per EPA 6000/7000 Series Methods**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4J0284-05</b>	<b>Water</b>			<b>B-29</b>					<b>Sampled: 10/06/04 08:40</b>	
Arsenic	EPA 6020	0.00337	----	0.00100	mg/l	1x	4100414	10/08/04	10/16/04	16:45
Barium	"	0.264	----	0.00100	"	"	"	"	"	"
Cadmium	"	0.0188	----	0.00100	"	"	"	"	"	"
Chromium	"	0.0197	----	0.00100	"	"	"	"	"	"
Copper	"	0.189	----	0.00200	"	"	"	"	"	"
Lead	"	0.0380	----	0.00100	"	"	"	"	"	"
Mercury	EPA 7470A	0.000213	----	0.000200	"	"	4100492	10/11/04	10/11/04	17:48
Selenium	EPA 6020	ND	----	0.00100	"	"	4100414	10/08/04	10/16/04	16:45
Silver	"	ND	----	0.00100	"	"	"	"	"	"
Zinc	"	0.0986	----	0.00500	"	"	"	"	"	"
<b>P4J0284-06</b>	<b>Water</b>			<b>B-30</b>					<b>Sampled: 10/06/04 09:20</b>	
Arsenic	EPA 6020	0.0172	----	0.00100	mg/l	1x	4100414	10/08/04	10/16/04	17:13
Barium	"	0.0850	----	0.00100	"	"	"	"	"	"
Cadmium	"	0.00676	----	0.00100	"	"	"	"	"	"
Chromium	"	0.00394	----	0.00100	"	"	"	"	"	"
Copper	"	0.0236	----	0.00200	"	"	"	"	"	"
Lead	"	0.0173	----	0.00100	"	"	"	"	"	"
Mercury	EPA 7470A	0.000370	----	0.000200	"	"	4100492	10/11/04	10/11/04	17:51
Selenium	EPA 6020	ND	----	0.00100	"	"	4100414	10/08/04	10/16/04	17:13
Silver	"	ND	----	0.00100	"	"	"	"	"	"
Zinc	"	0.0589	----	0.00500	"	"	"	"	"	"

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*Sarah Essarge*

Sarah Essarge, Project Manager

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Project Name: **CVX Willbridge / Chevron #100-1868**  
 Project Number: N/A  
 Project Manager: Gerry Koschal

Report Created:  
 10/20/04 18:38

**Total Metals per EPA 6000/7000 Series Methods**  
 North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4J0284-07</b>	<b>Water</b>			<b>B-30-DUP</b>					<b>Sampled: 10/06/04 08:00</b>	
Arsenic	EPA 6020	0.0178	----	0.00100	mg/l	1x	4100414	10/08/04	10/16/04	17:22
Barium	"	0.0920	----	0.00100	"	"	"	"	"	"
Cadmium	"	0.00875	----	0.00100	"	"	"	"	"	"
Chromium	"	0.00533	----	0.00100	"	"	"	"	"	"
Copper	"	0.0298	----	0.00200	"	"	"	"	"	"
Lead	"	0.0215	----	0.00100	"	"	"	"	"	"
Mercury	EPA 7470A	0.000238	----	0.000200	"	"	4100492	10/11/04	10/11/04	17:54
Selenium	EPA 6020	ND	----	0.00100	"	"	4100414	10/08/04	10/16/04	17:22
Silver	"	ND	----	0.00100	"	"	"	"	"	"
Zinc	"	0.0700	----	0.00500	"	"	"	"	"	"

North Creek Analytical - Portland

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*Sarah Essarge*

Sarah Essarge, Project Manager

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Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: N/A

Project Manager: Gerry Koschal

Report Created:

10/20/04 18:38

**BTEX Compounds per EPA Method 8260B**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4J0284-01</b>	<b>Water</b>			<b>CR-1</b>					<b>Sampled: 10/06/04 12:15</b>	
Benzene	EPA 8260B	ND	----	0.500	ug/l	1x	4100807	10/16/04	10/16/04	12:40
Toluene	"	ND	----	0.500	"	"	"	"	"	"
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	"
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	"
<i>Surrogate(s): 4-BFB Recovery: 100% Limits: 75 - 120 %</i>										
<i>1,2-DCA-d4 110% 77 - 129</i>										
<i>Dibromofluoromethane 113% 80 - 121</i>										
<i>Toluene-d8 90.0% 80 - 120</i>										

<b>P4J0284-02</b>	<b>Water</b>			<b>B-9</b>					<b>Sampled: 10/06/04 11:30</b>	
Benzene	EPA 8260B	ND	----	0.500	ug/l	1x	4100807	10/16/04	10/16/04	13:07
Toluene	"	ND	----	0.500	"	"	"	"	"	"
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	"
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	"
<i>Surrogate(s): 4-BFB Recovery: 100% Limits: 75 - 120 %</i>										
<i>1,2-DCA-d4 85.0% 77 - 129</i>										
<i>Dibromofluoromethane 98.0% 80 - 121</i>										
<i>Toluene-d8 96.0% 80 - 120</i>										

<b>P4J0284-03</b>	<b>Water</b>			<b>B-10</b>					<b>Sampled: 10/06/04 11:55</b>	
Benzene	EPA 8260B	<b>0.810</b>	----	0.500	ug/l	1x	4100807	10/16/04	10/16/04	13:33
Toluene	"	<b>2.62</b>	----	0.500	"	"	"	"	"	"
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	"
Xylenes (total)	"	<b>6.55</b>	----	1.00	"	"	"	"	"	"
<i>Surrogate(s): 4-BFB Recovery: 100% Limits: 75 - 120 %</i>										
<i>1,2-DCA-d4 107% 77 - 129</i>										
<i>Dibromofluoromethane 104% 80 - 121</i>										
<i>Toluene-d8 102% 80 - 120</i>										

North Creek Analytical - Portland

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Sarah Essarge, Project Manager

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: N/A

Project Manager: Gerry Koschal

Report Created:

10/20/04 18:38

**BTEX Compounds per EPA Method 8260B**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4J0284-04</b>	<b>Water</b>			<b>B-21</b>					<b>Sampled: 10/06/04 12:25</b>	
Benzene	EPA 8260B	ND	----	0.500	ug/l	1x	4100807	10/16/04	10/16/04 14:00	
Toluene	"	<b>0.880</b>	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB		Recovery: 16%		Limits: 75 - 120 %	"					"
1,2-DCA-d4		107%		77 - 129	"					"
Dibromofluoromethane		109%		80 - 121	"					"
Toluene-d8		99.5%		80 - 120	"					"
<b>P4J0284-05</b>	<b>Water</b>			<b>B-29</b>					<b>Sampled: 10/06/04 08:40</b>	
Benzene	EPA 8260B	ND	----	0.500	ug/l	1x	4100807	10/16/04	10/16/04 14:27	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB		Recovery: 18%		Limits: 75 - 120 %	"					"
1,2-DCA-d4		104%		77 - 129	"					" S-08
Dibromofluoromethane		113%		80 - 121	"					"
Toluene-d8		102%		80 - 120	"					"
<b>P4J0284-06</b>	<b>Water</b>			<b>B-30</b>					<b>Sampled: 10/06/04 09:20</b>	
Benzene	EPA 8260B	<b>15.8</b>	----	0.500	ug/l	1x	4100807	10/16/04	10/16/04 14:53	
Toluene	"	<b>4.19</b>	----	0.500	"	"	"	"	"	
Ethylbenzene	"	<b>0.500</b>	----	0.500	"	"	"	"	"	
Xylenes (total)	"	<b>8.45</b>	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB		Recovery: 16%		Limits: 75 - 120 %	"					"
1,2-DCA-d4		101%		77 - 129	"					"
Dibromofluoromethane		98.0%		80 - 121	"					"
Toluene-d8		96.5%		80 - 120	"					"

North Creek Analytical - Portland

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Sarah Essarge, Project Manager

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Environmental Laboratory Network

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: N/A

Project Manager: Gerry Koschal

Report Created:

10/20/04 18:38

**BTEX Compounds per EPA Method 8260B**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4J0284-07	Water									Sampled: 10/06/04 08:00
Benzene	EPA 8260B	21.4	----	0.500	ug/l	1x	4100807	10/16/04	10/16/04	15:20
Toluene	"	5.05	----	0.500	"	"	"	"	"	"
Ethylbenzene	"	0.570	----	0.500	"	"	"	"	"	"
Xylenes (total)	"	7.73	----	1.00	"	"	"	"	"	"
Surrogate(s): 4-BFB		Recovery: 188%		Limits: 75 - 120 %	"	"				"
1,2-DCA-d4		112%		77 - 129	"	"				"
Dibromofluoromethane		114%		80 - 121	"	"				"
Toluene-d8		114%		80 - 120	"	"				"
P4J0284-08	Water									Sampled: 10/06/04 08:40
Benzene	EPA 8260B	ND	----	0.500	ug/l	1x	4100807	10/16/04	10/16/04	12:13
Toluene	"	ND	----	0.500	"	"	"	"	"	"
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	"
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	"
Surrogate(s): 4-BFB		Recovery: 90%		Limits: 75 - 120 %	"	"				"
1,2-DCA-d4		105%		77 - 129	"	"				"
Dibromofluoromethane		110%		80 - 121	"	"				"
Toluene-d8		90.0%		80 - 120	"	"				"

North Creek Analytical - Portland

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Sarah Essarge, Project Manager

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Environmental Laboratory Network

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**Project Number: **N/A**Project Manager: **Gerry Koschal**

Report Created:

10/20/04 18:38

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4J0284-01	Water			CR-1					Sampled: 10/06/04 12:15	
Acenaphthene	EPA 8270m	1.20	----	0.100	ug/l	1x	4100625	10/13/04	10/18/04 20:07	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	0.123	----	0.100	"	"	"	"	"	
Benzo (a)anthracene	"	0.271	----	0.100	"	"	"	"	"	
Benzo (a)pyrene	"	0.311	----	0.100	"	"	"	"	"	
Benzo (b)fluoranthene	"	0.324	----	0.100	"	"	"	"	"	
Benzo (ghi)perylene	"	0.237	----	0.100	"	"	"	"	"	
Benzo (k)fluoranthene	"	0.306	----	0.100	"	"	"	"	"	
Chrysene	"	0.406	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	0.646	----	0.100	"	"	"	"	"	
Fluorene	"	4.30	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	0.224	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	1.10	"	"	"	"	"	R-03
Phenanthrene	"	1.42	----	0.100	"	"	"	"	"	
Pyrene	"	0.612	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 63%		Limits: 25 - 125 %	"					
Pyrene-d10		66.0%		23 - 150	"					
Benzo (a) pyrene-d12		51.2%		10 - 125	"					

North Creek Analytical - Portland

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Sarah Bissar, Project Manager

North Creek Analytical, Inc.  
Environmental Laboratory Network

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<b>SAIC</b>	Project Name: <b>CVX Willbridge / Chevron #100-1868</b>	Report Created:
1220 SW Morrison Suite 500	Project Number: N/A	10/20/04 18:38
Portland, OR 97205	Project Manager: Gerry Koschal	

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**  
 North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4J0284-02	Water			B-9					Sampled: 10/06/04 11:30	
Acenaphthene	EPA 8270m	0.536	----	0.100	ug/l	1x	4100625	10/13/04	10/18/04 18:59	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Fluorene	"	1.74	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	0.400	"	"	"	"	"	R-03
Phenanthrene	"	0.123	----	0.100	"	"	"	"	"	
Pyrene	"	ND	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 71%		Limits: 25 - 125 %	"				"	
Pyrene-d10		64.8%		23 - 150	"				"	
Benzo (a) pyrene-d12		55.9%		10 - 125	"				"	

North Creek Analytical - Portland

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

*Sarah Bissar*

Sarah Bissar, Project Manager

North Creek Analytical, Inc.  
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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: N/A

Project Manager: Gerry Koschal

Report Created:

10/20/04 18:38

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4J0284-03	Water			B-10					Sampled: 10/06/04 11:55	
Acenaphthene	EPA 8270m	2.81	----	1.00	ug/l	10x	4100625	10/13/04	10/19/04 14:49	
Acenaphthylene	"	ND	----	1.00	"	"	"	"	"	R-03
Anthracene	"	1.73	----	1.00	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	1x	"	"	10/18/04 19:33	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	0.152	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	2.11	----	1.00	"	10x	"	"	10/19/04 14:49	
Fluorene	"	10.3	----	1.00	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	1x	"	"	10/18/04 19:33	
Naphthalene	"	ND	----	2.30	"	10x	"	"	10/19/04 14:49	R-03
Phenanthrene	"	6.10	----	1.00	"	"	"	"	"	
Pyrene	"	2.02	----	0.100	"	1x	"	"	10/18/04 19:33	
Surrogate(s): Fluorene-d10	Recovery	80%		Limits: 25 - 125 %	10X				10/19/04 14:49	
Pyrene-d10		60.9%		23 - 150	1X				10/18/04 19:33	
Benzo (a) pyrene-d12		62.9%		10 - 125	"				"	

North Creek Analytical - Portland

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

*Sarah Rssarge*

Sarah Rssarge, Project Manager

North Creek Analytical, Inc.  
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# **SAIC**

1220 SW Morrison Suite 500  
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Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: N/A

Project Manager: Gerry Koschal

Report Created

10/20/04 18:38

## **Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4J0284-04</b>	<b>Water</b>			<b>B-21</b>					<b>Sampled: 10/06/04 12:25</b>	
<b>Acenaphthene</b>	EPA 8270m	<b>3.10</b>	----	1.00	ug/l	10x	4100625	10/13/04	10/19/04 14:13	
Acenaphthylene	"	ND	----	1.00	"	"	"	"	"	<b>R-03</b>
Anthracene	"	ND	----	1.00	"	"	"	"	"	<b>R-03</b>
Benzo (a) anthracene	"	ND	----	0.100	"	1x	"	"	10/18/04 18:25	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	1.50	"	10x	"	"	10/19/04 14:13	<b>R-03</b>
<b>Fluorene</b>	"	<b>9.93</b>	----	1.00	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	1x	"	"	10/18/04 18:25	
Naphthalene	"	ND	----	2.00	"	10x	"	"	10/19/04 14:13	<b>R-03</b>
<b>Phenanthrene</b>	"	<b>7.21</b>	----	1.00	"	"	"	"	"	
Pyrene	"	ND	----	0.200	"	1x	"	"	10/18/04 18:25	<b>R-03</b>
Surrogate(s): Fluorene-d10		Recovery: 72%		Limits: 25 - 125 %	10X				10/19/04 14:13	
Pyrene-d10		64.8%		23 - 150	1X				10/18/04 18:25	
Benzo (a) pyrene-d12		53.4%		10 - 125	"				"	

North Creek Analytical - Portland

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be produced in its entirety.

*Sarah Bessarge*

Sarah Bessarge, Project Manager

North Creek Analytical, Inc.  
Environmental Laboratory Network

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: N/A

Project Manager: Gerry Koschal

Report Created:

10/20/04 18:38

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4J0284-05</b>	<b>Water</b>			<b>B-29</b>					<b>Sampled: 10/06/04 08:40</b>	
Acenaphthene	EPA 8270m	ND	----	0.100	ug/l	1x	4100625	10/13/04	10/18/04 20:41	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
<b>Benzo (ghi) perylene</b>	"	<b>0.105</b>	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Fluorene	"	ND	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	0.100	"	"	"	"	"	
Phenanthrene	"	ND	----	0.100	"	"	"	"	"	
Pyrene	"	ND	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 82%		Limits: 25 - 125 %	"					"
Pyrene-d10		58.4%		23 - 150	"					"
Benzo (a) pyrene-d12		38.2%		10 - 125	"					"

North Creek Analytical - Portland

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Sarah Bssarge, Project Manager

North Creek Analytical, Inc.  
Environmental Laboratory Network

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: N/A

Project Manager: Gerry Koschal

Report Created:

10/20/04 18:38

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4J0284-06	Water			B-30					Sampled: 10/06/04 09:2R-05	
Acenaphthene	EPA 8270m	ND	-----	0.500	ug/l	2x	4100625	10/13/04	10/18/04 21:15	R-03
Acenaphthylene	"	ND	-----	0.200	"	"	"	"	"	
Anthracene	"	ND	-----	0.200	"	"	"	"	"	
Benzo (a) anthracene	"	ND	-----	0.200	"	"	"	"	"	
Benzo (a) pyrene	"	0.200	-----	0.200	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	-----	0.200	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	-----	0.200	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	-----	0.200	"	"	"	"	"	
Chrysene	"	0.218	-----	0.200	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	-----	0.400	"	"	"	"	"	
Fluoranthene	"	0.252	-----	0.200	"	"	"	"	"	
Fluorene	"	ND	-----	0.200	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	-----	0.200	"	"	"	"	"	
Naphthalene	"	ND	-----	0.300	"	"	"	"	"	R-03
Phenanthrene	"	0.249	-----	0.200	"	"	"	"	"	
Pyrene	"	0.489	-----	0.200	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 78%		Limits: 25 - 125 %	"				"	
Pyrene-d10		73.3%		23 - 150	"				"	
Benzo (a) pyrene-d12		49.6%		10 - 125	"				"	

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: N/A

Project Manager: Gerry Koschal

Report Created:

10/20/04 18:38

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4J0284-07</b>	<b>Water</b>			<b>B-30-DUP</b>					<b>Sampled: 10/06/04 R00500</b>	
Acenaphthene	EPA 8270m	ND	----	0.400	ug/l	2x	4100625	10/13/04	10/18/04 21:49	<b>R-03</b>
Acenaphthylene	"	ND	----	0.200	"	"	"	"	"	
Anthracene	"	ND	----	0.200	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.200	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.200	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.200	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.200	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.200	"	"	"	"	"	
Chrysene	"	ND	----	0.200	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.400	"	"	"	"	"	
Fluoranthene	"	ND	----	0.200	"	"	"	"	"	
Fluorene	"	ND	----	0.200	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.200	"	"	"	"	"	
Naphthalene	"	ND	----	0.200	"	"	"	"	"	
Phenanthrene	"	ND	----	0.200	"	"	"	"	"	
<b>Pyrene</b>	"	<b>0.389</b>	----	0.200	"	"	"	"	"	
<hr/>										
Surrogate(s): Fluorene-d10		Recovery: 84%		Limits: 25 - 125 %	"					"
Pyrene-d10		77.1%		23 - 150	"					"
Benzo (a) pyrene-d12		53.8%		10 - 125	"					"

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: N/A

Project Manager: Gerry Koschal

Report Created:

10/20/04 18:38

**Total Metals per EPA 6000/7000 Series Methods - Laboratory Quality Control Results**  
**North Creek Analytical - Portland**

**QC Batch: 4100414 Water Preparation Method: EPA 200/3005**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	-------	----------	-------	----------	----------	-------

**Blank (4100414-BLK1)**

Extracted: 10/08/04 10:02

Arsenic	EPA 6020	ND	---	0.00100	mg/l	1x	--	--	--	--	--	--	10/16/04 12:12	
Barium	"	ND	---	0.00100	"	"	--	--	--	--	--	--	"	
Cadmium	"	ND	---	0.00100	"	"	--	--	--	--	--	--	"	
Chromium	"	ND	---	0.00100	"	"	--	--	--	--	--	--	"	
Copper	"	ND	---	0.00200	"	"	--	--	--	--	--	--	"	
Lead	"	ND	---	0.00100	"	"	--	--	--	--	--	--	"	
Selenium	"	ND	---	0.00100	"	"	--	--	--	--	--	--	"	
Silver	"	ND	---	0.00100	"	"	--	--	--	--	--	--	"	
Zinc	"	ND	---	0.00500	"	"	--	--	--	--	--	--	"	

**LCS (4100414-BS1)**

Extracted: 10/08/04 10:02

Arsenic	EPA 6020	0.107	---	0.00100	mg/l	1x	--	0.100	107%	(80-120)	--	--	10/16/04 12:21	
Barium	"	0.110	---	0.00100	"	"	--	"	110%	"	--	--	"	
Cadmium	"	0.107	---	0.00100	"	"	--	"	107%	"	--	--	"	
Chromium	"	0.106	---	0.00100	"	"	--	"	106%	"	--	--	"	
Copper	"	0.108	---	0.00200	"	"	--	"	108%	"	--	--	"	
Lead	"	0.105	---	0.00100	"	"	--	"	105%	"	--	--	"	
Selenium	"	0.103	---	0.00100	"	"	--	"	103%	"	--	--	"	
Silver	"	0.114	---	0.00100	"	"	--	"	114%	"	--	--	"	
Zinc	"	0.104	---	0.00500	"	"	--	"	104%	"	--	--	"	

**LCS Dup (4100414-BSD1)**

Extracted: 10/08/04 10:02

Arsenic	EPA 6020	0.106	---	0.00100	mg/l	1x	--	0.100	106%	(80-120)	0.939% (20)		10/16/04 12:31	
Barium	"	0.109	---	0.00100	"	"	--	"	109%	"	0.913% "		"	
Cadmium	"	0.106	---	0.00100	"	"	--	"	106%	"	0.939% "		"	
Chromium	"	0.106	---	0.00100	"	"	--	"	106%	"	0.00% "		"	
Copper	"	0.107	---	0.00200	"	"	--	"	107%	"	0.930% "		"	
Lead	"	0.105	---	0.00100	"	"	--	"	105%	"	0.00% "		"	
Selenium	"	0.102	---	0.00100	"	"	--	"	102%	"	0.976% "		"	
Silver	"	0.112	---	0.00100	"	"	--	"	112%	"	1.77% "		"	
Zinc	"	0.104	---	0.00500	"	"	--	"	104%	"	0.00% "		"	

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# SAIC

1220 SW Morrison Suite 500  
 Portland, OR 97205

Project Nam: **CVX Willbridge / Chevron #100-1868**

Project Nbr: N/A

Project Manager: Gerry Koschal

Report Created:

10/20/04 18:38

## Total Metals per EPA 6000/7000 Series Methods - Laboratory Quality Control Results North Creek Analytical - Portland

QC Batch: **4100414** Water Preparation Method: **EPA 200/3005**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC (Limits)	% RPD (Limits)	Analyzed	Notes
<b>Duplicate (4100414-DUP1)</b>			<b>QC Source: P4J0273-01</b>		<b>Extracted: 10/08/04 10:02</b>							
Arsenic	EPA 6020	0.00397	---	0.00100	mg/l	1x	0.00418	--	--	5.15% (20)	10/16/04 13:34	
Barium	"	0.0317	---	0.00100	"	"	0.0324	--	--	2.18% "	"	
Cadmium	"	ND	---	0.00100	"	"	ND	--	--	NR "	"	
Chromium	"	0.00136	---	0.00100	"	"	0.00148	--	--	8.45% "	"	
Copper	"	0.0142	---	0.00200	"	"	0.0151	--	--	6.14% "	"	
Lead	"	0.000400	---	0.00100	"	"	ND	--	--	NR "	"	Q-06
Selenium	"	ND	---	0.00100	"	"	ND	--	--	NR "	"	
Silver	"	ND	---	0.00100	"	"	ND	--	--	NR "	"	
Zinc	"	0.00437	---	0.00500	"	"	ND	--	--	NR "	"	

<b>Matrix Spike (4100414-MS1)</b>			<b>QC Source: P4J0273-02</b>		<b>Extracted: 10/08/04 10:02</b>							
Arsenic	EPA 6020	0.107	---	0.00100	mg/l	1x	0.00149	0.100	106% (75-125)	--	10/16/04 13:53	
Barium	"	0.228	---	0.00100	"	"	0.120	"	108% "	--	"	
Cadmium	"	0.106	---	0.00100	"	"	ND	"	106% "	--	"	
Chromium	"	0.105	---	0.00100	"	"	ND	"	105% "	--	"	
Copper	"	0.111	---	0.00200	"	"	0.00724	"	104% "	--	"	
Lead	"	0.104	---	0.00100	"	"	ND	"	104% "	--	"	
Selenium	"	0.101	---	0.00100	"	"	ND	"	101% "	--	"	
Silver	"	0.112	---	0.00100	"	"	ND	"	112% "	--	"	
Zinc	"	0.101	---	0.00500	"	"	ND	"	101% "	--	"	

<b>Matrix Spike (4100414-MS2)</b>			<b>QC Source: P4J0273-03</b>		<b>Extracted: 10/08/04 10:02</b>							
Arsenic	EPA 6020	0.111	---	0.00100	mg/l	1x	0.00511	0.100	106% (75-125)	--	10/16/04 14:11	
Barium	"	0.130	---	0.00100	"	"	0.0208	"	109% "	--	"	
Cadmium	"	0.105	---	0.00100	"	"	ND	"	105% "	--	"	
Chromium	"	0.108	---	0.00100	"	"	0.00142	"	107% "	--	"	
Copper	"	0.113	---	0.00200	"	"	0.00837	"	105% "	--	"	
Lead	"	0.106	---	0.00100	"	"	ND	"	105% "	--	"	
Selenium	"	0.103	---	0.00100	"	"	ND	"	103% "	--	"	
Silver	"	0.114	---	0.00100	"	"	ND	"	114% "	--	"	
Zinc	"	0.112	---	0.00500	"	"	0.00669	"	105% "	--	"	

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*Sarah Bessarge*

Sarah Bessarge, Project Manager

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: N/A

Project Manager: Gerry Koschal

Report Created:

10/20/04 18:38

**Total Metals per EPA 6000/7000 Series Methods - Laboratory Quality Control Results**  
**North Creek Analytical - Portland**

**QC Batch: 4100492 Water Preparation Method: EPA 7470A**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
<b>Blank (4100492-BLK1)</b>										Extracted: 10/11/04 09:46				
Mercury	EPA 7470A	ND	---	0.000200	mg/l	1x	--	--	--	--	--	--	10/11/04 18:41	
<b>LCS (4100492-BS1)</b>										Extracted: 10/11/04 09:46				
Mercury	EPA 7470A	0.00506	---	0.000200	mg/l	1x	--	0.00500	101%	(85-115)	--	--	10/11/04 15:18	
<b>LCS Dup (4100492-BSD1)</b>										Extracted: 10/11/04 09:46				
Mercury	EPA 7470A	0.00526	---	0.000200	mg/l	1x	--	0.00500	105%	(85-115)	3.88%	(20)	10/11/04 15:21	
<b>Duplicate (4100492-DUP1)</b>										QC Source: P4J0275-01 Extracted: 10/11/04 09:46				
Mercury	EPA 7470A	ND	---	0.000200	mg/l	1x	ND	--	--	--	NR	(20)	10/11/04 15:26	
<b>Matrix Spike (4100492-MS1)</b>										QC Source: P4J0275-01 Extracted: 10/11/04 09:46				
Mercury	EPA 7470A	0.00468	---	0.000200	mg/l	1x	ND	0.00500	93.6%	(75-125)	--	--	10/11/04 15:29	
<b>Matrix Spike Dup (4100492-MSD1)</b>										QC Source: P4J0275-01 Extracted: 10/11/04 09:46				
Mercury	EPA 7470A	0.00466	---	0.000200	mg/l	1x	ND	0.00500	93.2%	(75-125)	0.428%	(20)	10/11/04 15:32	

North Creek Analytical - Portland

Sarah Bssarge, Project Manager

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**Project Number: **N/A**Project Manager: **Gerry Koschal**

Report Created:

10/20/04 18:38

**BTEX Compounds per EPA Method 8260B - Laboratory Quality Control Results**  
**North Creek Analytical - Portland****QC Batch: 4100807 Water Preparation Method: EPA 5030B**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	-------	----------	-------	----------	----------	-------

**Blank (4100807-BLK1)**

Extracted: 10/16/04 08:42

Benzene	EPA 8260B	ND	---	0.500	ug/l	1x	--	--	--	--	--	--	10/16/04 11:46	
Toluene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Ethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Xylenes (total)	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
Surrogate(s): 4-BFB		Recovery:	98.5%	Limits:	75-120%	"							10/16/04 11:46	
1,2-DCA-d4			106%		77-129%	"							"	
Dibromofluoromethane			110%		80-121%	"							"	
Toluene-d8			99.5%		80-120%	"							"	

**LCS (4100807-BS1)**

Extracted: 10/16/04 08:42

Benzene	EPA 8260B	20.1	---	0.500	ug/l	1x	--	20.0	100%	(80-120)	--	--	10/16/04 10:00	
Toluene	"	20.0	---	0.500	"	"	--	"	100%	(80-124)	--	--	"	
Ethylbenzene	"	21.6	---	0.500	"	"	--	"	108%	(80-120)	--	--	"	
Xylenes (total)	"	67.4	---	1.00	"	"	--	60.0	112%	(73-124)	--	--	"	
Surrogate(s): 4-BFB		Recovery:	108%	Limits:	75-120%	"							10/16/04 10:00	
1,2-DCA-d4			104%		77-129%	"							"	
Dibromofluoromethane			101%		80-121%	"							"	
Toluene-d8			102%		80-120%	"							"	

**Matrix Spike (4100807-MS1)**QC Source: **P4J0284-01**

Extracted: 10/16/04 08:42

Benzene	EPA 8260B	18.8	---	0.500	ug/l	1x	ND	20.0	94.0%	(80-124)	--	--	10/16/04 10:26	
Toluene	"	15.1	---	0.500	"	"	ND	"	75.5%	(79.7-131)	--	--	"	Q-01
Ethylbenzene	"	15.5	---	0.500	"	"	ND	"	77.5%	(80-124)	--	--	"	Q-01
Xylenes (total)	"	31.2	---	1.00	"	"	ND	60.0	52.0%	(44.6-154)	--	--	"	
Surrogate(s): 4-BFB		Recovery:	104%	Limits:	75-120%	"							10/16/04 10:26	
1,2-DCA-d4			104%		77-129%	"							"	
Dibromofluoromethane			102%		80-121%	"							"	
Toluene-d8			93.0%		80-120%	"							"	

**Matrix Spike Dup (4100807-MSD1)**QC Source: **P4J0284-01**

Extracted: 10/16/04 08:42

Benzene	EPA 8260B	18.6	---	0.500	ug/l	1x	ND	20.0	93.0%	(80-124)	1.07%	(25)	10/16/04 10:53	
Toluene	"	14.6	---	0.500	"	"	ND	"	73.0%	(79.7-131)	3.37%	"	"	Q-01
Ethylbenzene	"	15.3	---	0.500	"	"	ND	"	76.5%	(80-124)	1.30%	"	"	Q-01
Xylenes (total)	"	30.2	---	1.00	"	"	ND	60.0	50.3%	(44.6-154)	3.26%	"	"	
Surrogate(s): 4-BFB		Recovery:	108%	Limits:	75-120%	"							10/16/04 10:53	
1,2-DCA-d4			104%		77-129%	"							"	
Dibromofluoromethane			103%		80-121%	"							"	
Toluene-d8			94.0%		80-120%	"							"	

North Creek Analytical - Portland

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Sarah Rissarge, Project Manager

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1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: **N/A**

Project Manager: **Gerry Koschal**

Report Created:

10/20/04 18:38

**Polynuclear Aromatic Compounds per EPA 8270M-SIM - Laboratory Quality Control Results**  
**North Creek Analytical - Portland**

**QC Batch: 4100625 Water Preparation Method: EPA 3510/600 Series**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	-------	----------	-------	----------	----------	-------

**Blank (4100625-BLK1)**

Extracted: 10/13/04 08:22

Acenaphthene	EPA 8270m	ND	---	0.100	ug/l	1x	--	--	--	--	--	--	10/18/04 22:23	
Acenaphthylene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Anthracene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (a) anthracene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (a) pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (b) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (ghi) perylene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (k) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Chrysene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Dibenzo (a,h) anthracene	"	ND	---	0.200	"	"	--	--	--	--	--	--	"	
Fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Fluorene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Indeno (1,2,3-cd) pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Naphthalene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Phenanthrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	

Surrogate(s): Fluorene-d10

Recovery: 77.2%

Limits: 25-125% "

10/18/04 22:23

Pyrene-d10

72.8%

23-150% "

"

Benzo (a) pyrene-d12

70.4%

10-125% "

"

**LCS (4100625-BS1)**

Extracted: 10/13/04 08:22

Acenaphthene	EPA 8270m	1.69	---	0.100	ug/l	1x	--	2.50	67.6%	(26-135)	--	--	10/18/04 22:57	
Benzo (a) pyrene	"	1.54	---	0.100	"	"	--	"	61.6%	(38-137)	--	--	"	
Pyrene	"	1.72	---	0.100	"	"	--	"	68.8%	(33-133)	--	--	"	

Surrogate(s): Fluorene-d10

Recovery: 80.0%

Limits: 25-125% "

10/18/04 22:57

Pyrene-d10

68.4%

23-150% "

"

Benzo (a) pyrene-d12

69.2%

10-125% "

"

**LCS Dup (4100625-BSD1)**

Extracted: 10/13/04 08:22

Acenaphthene	EPA 8270m	1.58	---	0.100	ug/l	1x	--	2.50	63.2%	(26-135)	6.73%	(60)	10/18/04 23:31	
Benzo (a) pyrene	"	1.54	---	0.100	"	"	--	"	61.6%	(38-137)	0.00%	"	"	
Pyrene	"	1.58	---	0.100	"	"	--	"	63.2%	(33-133)	8.48%	"	"	

Surrogate(s): Fluorene-d10

Recovery: 70.4%

Limits: 25-125% "

10/18/04 23:31

Pyrene-d10

60.0%

23-150% "

"

Benzo (a) pyrene-d12

62.4%

10-125% "

"

North Creek Analytical - Portland

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Sarah Essarge, Project Manager

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Environmental Laboratory Network

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: N/A

Project Manager: Gerry Koschal

Report Created:

10/20/04 18:38

**Notes and Definitions**Report Specific Notes:

- Q-01 - The matrix spike recovery, and/or RPD, for this QC sample is outside of established control limits. Failure of a matrix spike does not represent an out-of-control condition for the batch.
- Q-06 - RPD is not applicable for analyte concentrations less than 5 times the MRL.
- R-03 - The reporting limit for this analyte was raised due to matrix interference.
- R-05 - Reporting limits raised due to dilution necessary for analysis. Sample contains high levels of reported analyte, non-target analyte or matrix interference.
- S-08 - Surrogate recovery is above control limits. Since no analytes were detected in the sample, the quality of the data has not been evaluated.

Laboratory Reporting Conventions:

DET Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.

ND Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).

NR NA Not Reported Not Available

dry Sample results reported on dry weight basis Reporting Limits are corrected for %Solids when %Solids are <50%.

wet Sample results and reporting limits reported on wet weight basis (as received).

RPD Relative Percent Difference (RPDs calculated using Results, not Percent Recoveries).

MRL METHOD REPORTING LIMIT Reporting Level at, or above, the lowest level standard of the Calibration Table.

MDL\* METHOD DETECTION LIMIT Reporting Level at, or above, the statistically derived limit based on 40 CFR, Part 136, Appendix B  
\*MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated results.

Dil Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.

Reporting limits - Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.

North Creek Analytical - Portland

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Sarah Bissage, Project Manager

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Environmental Laboratory Network

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October 19, 2004

Gerry Koschal  
SAIC  
1220 SW Morrison Suite 500  
Portland, OR 97205

RE: CVX Willbridge / Chevron #100-1868

Enclosed are the results of analyses for samples received by the laboratory on 10/05/04 18:35.  
The following list is a summary of the NCA Work Orders contained in this report.  
If you have any questions concerning this report, please feel free to contact me.

<u>Work</u>	<u>Project</u>	<u>ProjectNumber</u>
P4J0240	CVX Willbridge / Chevron #100-	100-1868

Thank You,

Sarah Passarge, Project Manager

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**North Creek Analytical, Inc.**  
**Environmental Laboratory Network**

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: 100-1868

Project Manager: Gerry Koschal

Report Created:

10/19/04 15:36

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B-28	P4J0240-01	Water	10/05/04 13:35	10/05/04 18:35

North Creek Analytical - Portland

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Sarah Rssarge, Project Manager

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<b>SAIC</b>	Project Name: <b>CVX Willbridge / Chevron #100-1868</b>	Report Created:
1220 SW Morrison Suite 500	Project Number: 100-1868	10/19/04 15:36
Portland, OR 97205	Project Manager: Gerry Koschal	

**Total Metals per EPA 6000/7000 Series Methods**  
 North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4J0240-01</b>	<b>Water</b>			<b>B-28</b>					<b>Sampled: 10/05/04 13:35</b>	
Arsenic	EPA 6020	0.0131	----	0.00100	mg/l	1x	4100355	10/07/04	10/16/04 02:00	
Barium	"	0.245	----	0.00100	"	"	"	"	"	
Cadmium	"	0.00142	----	0.00100	"	"	"	"	"	
Chromium	"	0.0251	----	0.00100	"	"	"	"	"	
Copper	"	0.0750	----	0.00200	"	"	"	"	"	
Lead	"	0.0180	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	ND	----	0.000200	"	"	4100353	10/07/04	10/08/04 10:15	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100355	10/07/04	10/16/04 02:00	
Silver	"	ND	----	0.00100	"	"	"	"	"	
Zinc	"	0.0965	----	0.00500	"	"	"	"	"	

North Creek Analytical - Portland

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Sarah Essarge, Project Manager

North Creek Analytical, Inc.  
 Environmental Laboratory Network



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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: 100-1868

Project Manager: Gerry Koschal

Report Created:

10/19/04 15:36

**BTEX Compounds per EPA Method 8260B**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4J0240-01</b>	<b>Water</b>			<b>B-28</b>					<b>Sampled: 10/05/04 13:35</b>	
Benzene	EPA 8260B	ND	----	0.500	ug/l	1x	4100637	10/13/04	10/13/04	17:57
Toluene	"	ND	----	0.500	"	"	"	"	"	"
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	"
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	"
<i>Surrogate(s): 4-BFB</i>										
		<i>Recovery: 90%</i>		<i>Limits: 75 - 120 %</i>		"				"
		<i>1,2-DCA-d4</i>		<i>95.0%</i>		<i>77 - 129</i>				"
		<i>Dibromofluoromethane</i>		<i>97.0%</i>		<i>80 - 121</i>				"
		<i>Toluene-d8</i>		<i>92.5%</i>		<i>80 - 120</i>				"

North Creek Analytical - Portland

Sarah Essarge, Project Manager

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: 100-1868

Project Manager: Gerry Koschal

Report Created:

10/19/04 15:36

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4J0240-01</b>	<b>Water</b>			<b>B-28</b>					<b>Sampled: 10/05/04 13:35</b>	
Acenaphthene	EPA 8270m	ND	----	0.100	ug/l	1x	4100552	10/12/04	10/15/04	16:24
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	"
Anthracene	"	ND	----	0.100	"	"	"	"	"	"
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	"
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	"
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	"
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	"
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	"
Chrysene	"	ND	----	0.100	"	"	"	"	"	"
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	"
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	"
Fluorene	"	ND	----	0.100	"	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	"
Naphthalene	"	ND	----	0.100	"	"	"	"	"	"
Phenanthrene	"	ND	----	0.100	"	"	"	"	"	"
Pyrene	"	ND	----	0.100	"	"	"	"	"	"
Surrogate(s): Fluorene-d10		Recovery: 7.9%		Limits: 25 - 125 %	"					"
Pyrene-d10		89.9%		23 - 150	"					"
Benzo (a) pyrene-d12		57.1%		10 - 125	"					"

North Creek Analytical - Portland

Sarah Bssarge, Project Manager

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<b>SAIC</b>	Project Name: <b>CVX Willbridge / Chevron #100-1868</b>	Report Created:
1220 SW Morrison Suite 500	Project Number: 100-1868	10/19/04 15:36
Portland, OR 97205	Project Manager: Gerry Koschal	

**Total Metals per EPA 6000/7000 Series Methods - Laboratory Quality Control Results**  
**North Creek Analytical - Portland**

**QC Batch: 4100353 Water Preparation Method: EPA 7470A**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC (Limits)	% RPD (Limits)	Analyzed	Notes
<b>Blank (4100353-BLK1)</b>										Extracted: 10/07/04 13:12		
Mercury	EPA 7470A	ND	---	0.000200	mg/l	1x	--	--	--	--	10/08/04 09:42	
<b>LCS (4100353-BS1)</b>										Extracted: 10/07/04 13:12		
Mercury	EPA 7470A	0.00474	---	0.000200	mg/l	1x	--	0.00500	94.8% (85-115)	--	10/08/04 09:45	
<b>LCS Dup (4100353-BSD1)</b>										Extracted: 10/07/04 13:12		
Mercury	EPA 7470A	0.00528	---	0.000200	mg/l	1x	--	0.00500	106% (85-115)	10.8% (20)	10/08/04 09:52	
<b>Duplicate (4100353-DUP1)</b>										QC Source: P4J0190-01 Extracted: 10/07/04 13:12		
Mercury	EPA 7470A	ND	---	0.000200	mg/l	1x	0.000214	--	--	NR (20)	10/08/04 09:55	
<b>Matrix Spike (4100353-MS1)</b>										QC Source: P4J0190-01 Extracted: 10/07/04 13:12		
Mercury	EPA 7470A	0.00497	---	0.000200	mg/l	1x	0.000214	0.00500	95.1% (75-125)	--	10/08/04 09:58	
<b>Matrix Spike Dup (4100353-MSD1)</b>										QC Source: P4J0190-01 Extracted: 10/07/04 13:12		
Mercury	EPA 7470A	0.00489	---	0.000200	mg/l	1x	0.000214	0.00500	93.5% (75-125)	1.62% (20)	10/08/04 10:01	

**QC Batch: 4100355 Water Preparation Method: EPA 200/3005**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC (Limits)	% RPD (Limits)	Analyzed	Notes
<b>Blank (4100355-BLK1)</b>										Extracted: 10/07/04 13:37		
Arsenic	EPA 6020	ND	---	0.00100	mg/l	1x	--	--	--	--	10/18/04 10:17	
Barium	"	ND	---	0.00100	"	"	--	--	--	--	10/15/04 19:29	
Cadmium	"	ND	---	0.00100	"	"	--	--	--	--	"	
Chromium	"	ND	---	0.00100	"	"	--	--	--	--	"	
Copper	"	ND	---	0.00200	"	"	--	--	--	--	"	
Lead	"	ND	---	0.00100	"	"	--	--	--	--	"	
Selenium	"	ND	---	0.00100	"	"	--	--	--	--	"	
Silver	"	ND	---	0.00100	"	"	--	--	--	--	"	
Zinc	"	ND	---	0.00500	"	"	--	--	--	--	"	
<b>LCS (4100355-BS1)</b>										Extracted: 10/07/04 13:37		
Arsenic	EPA 6020	0.103	---	0.00100	mg/l	1x	--	0.100	103% (80-120)	--	10/15/04 22:31	
Barium	"	0.104	---	0.00100	"	"	--	"	104%	--	"	
Cadmium	"	0.0996	---	0.00100	"	"	--	"	99.6%	--	"	
Chromium	"	0.102	---	0.00100	"	"	--	"	102%	--	"	
Copper	"	0.100	---	0.00200	"	"	--	"	100%	--	"	
Lead	"	0.103	---	0.00100	"	"	--	"	103%	--	"	
Selenium	"	0.0990	---	0.00100	"	"	--	"	99.0%	--	"	
Silver	"	0.0976	---	0.00100	"	"	--	"	97.6%	--	"	

North Creek Analytical - Portland

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*Sarah Bssarge*

Sarah Bssarge, Project Manager

North Creek Analytical, Inc.  
Environmental Laboratory Network



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# SAIC

1220 SW Morrison Suite 500  
 Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: 100-1868

Project Manager: Gerry Koschal

Report Created:

10/19/04 15:36

## Total Metals per EPA 6000/7000 Series Methods Laboratory Quality Control Results North Creek Analytical - Portland

QC Batch: 4100355 Water Preparation Method: EPA 200/3005

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	-------	----------	-------	----------	----------	-------

### LCS (4100355-BS1)

Extracted: 10/07/04 13:37

Zinc	EPA 6020	0.0991	---	0.00500	mg/l	1x	--	0.100	99.1%	(80-120)	--	--	10/15/04 22:31	
------	----------	--------	-----	---------	------	----	----	-------	-------	----------	----	----	----------------	--

### LCS Dup (4100355-BSD1)

Extracted: 10/07/04 13:37

Arsenic	EPA 6020	0.109	---	0.00100	mg/l	1x	--	0.100	109%	(80-120)	5.66%	(20)	10/16/04 01:33	
Barium	"	0.110	---	0.00100	"	"	--	"	110%	"	5.61%	"	"	
Cadmium	"	0.112	---	0.00100	"	"	--	"	112%	"	11.7%	"	"	
Chromium	"	0.111	---	0.00100	"	"	--	"	111%	"	8.45%	"	"	
Copper	"	0.110	---	0.00200	"	"	--	"	110%	"	9.52%	"	"	
Lead	"	0.110	---	0.00100	"	"	--	"	110%	"	6.57%	"	"	
Selenium	"	0.107	---	0.00100	"	"	--	"	107%	"	7.77%	"	"	
Silver	"	0.109	---	0.00100	"	"	--	"	109%	"	11.0%	"	"	
Zinc	"	0.110	---	0.00500	"	"	--	"	110%	"	10.4%	"	"	

### Duplicate (4100355-DUP1)

QC Source: P4J0243-01

Extracted: 10/07/04 13:37

Arsenic	EPA 6020	0.000520	---	0.00100	mg/l	1x	ND	--	--	--	NR	(20)	10/16/04 03:05	Q-06
Barium	"	0.0245	---	0.00100	"	"	0.0250	--	--	--	2.02%	"	"	
Cadmium	"	ND	---	0.00100	"	"	ND	--	--	--	NR	"	"	
Chromium	"	0.00203	---	0.00100	"	"	0.00218	--	--	--	7.13%	"	"	
Copper	"	ND	---	0.00200	"	"	ND	--	--	--	NR	"	"	
Lead	"	0.000300	---	0.00100	"	"	ND	--	--	--	NR	"	"	
Selenium	"	ND	---	0.00100	"	"	ND	--	--	--	NR	"	"	
Silver	"	ND	---	0.00100	"	"	ND	--	--	--	NR	"	"	
Zinc	"	0.00224	---	0.00500	"	"	ND	--	--	--	NR	"	"	

### Matrix Spike (4100355-MS1)

QC Source: P4J0243-01

Extracted: 10/07/04 13:37

Arsenic	EPA 6020	0.111	---	0.00100	mg/l	1x	ND	0.100	110%	(75-125)	--	--	10/16/04 03:14	
Barium	"	0.142	---	0.00100	"	"	0.0250	"	117%	"	--	--	"	
Cadmium	"	0.112	---	0.00100	"	"	ND	"	112%	"	--	--	"	
Chromium	"	0.116	---	0.00100	"	"	0.00218	"	114%	"	--	--	"	
Copper	"	0.113	---	0.00200	"	"	ND	"	113%	"	--	--	"	
Lead	"	0.114	---	0.00100	"	"	ND	"	114%	"	--	--	"	
Selenium	"	0.108	---	0.00100	"	"	ND	"	108%	"	--	--	"	
Silver	"	0.110	---	0.00100	"	"	ND	"	110%	"	--	--	"	
Zinc	"	0.114	---	0.00500	"	"	ND	"	112%	"	--	--	"	

North Creek Analytical - Portland

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*Sarah Bssarge*

Sarah Bssarge, Project Manager

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 Environmental Laboratory Network

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<b>SAIC</b> 1220 SW Morrison Suite 500 Portland, OR 97205	Project Name:	<b>CVX Willbridge / Chevron #100-1868</b>	
	Project Number:	100-1868	
	Project Manager:	Gerry Koschal	
			Report Created: 10/19/04 15:36

**Total Metals per EPA 6000/7000 Series Methods - Laboratory Quality Control Results**  
**North Creek Analytical - Portland**

**QC Batch: 4100355 Water Preparation Method: EPA 200/3005**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
<b>Matrix Spike (4100355-MS2)</b>							<b>QC Source: P4J0243-02</b>			<b>Extracted: 10/07/04 13:37</b>				
Arsenic	EPA 6020	0.114	---	0.00100	mg/l	1x	0.00807	0.100	106%	(75-125)	--	--	10/16/04 03:32	
Barium	"	0.134	---	0.00100	"	"	0.0263	"	108%	"	--	--	"	
Cadmium	"	0.108	---	0.00100	"	"	ND	"	108%	"	--	--	"	
Chromium	"	0.108	---	0.00100	"	"	ND	"	108%	"	--	--	"	
Copper	"	0.107	---	0.00200	"	"	ND	"	107%	"	--	--	"	
Lead	"	0.109	---	0.00100	"	"	ND	"	109%	"	--	--	"	
Selenium	"	0.105	---	0.00100	"	"	ND	"	105%	"	--	--	"	
Silver	"	0.108	---	0.00100	"	"	ND	"	108%	"	--	--	"	
Zinc	"	0.108	---	0.00500	"	"	ND	"	104%	"	--	--	"	

North Creek Analytical - Portland

Sarah Essarge, Project Manager

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<b>SAIC</b> 1220 SW Morrison Suite 500 Portland, OR 97205	Project Name: <b>CVX Willbridge / Chevron #100-1868</b> Project Number: <b>100-1868</b> Project Manager: <b>Gerry Koschal</b>	Report Created: <b>10/19/04 15:36</b>
---	---	--

**BTEX Compounds per EPA Method 8260B - Laboratory Quality Control Results**  
**North Creek Analytical - Portland**

<b>QC Batch:</b> 4100637	<b>Water Preparation Method:</b> EPA 5030B
--------------------------	--

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC (Limits)	% RPD (Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	----------------	----------------	----------	-------

<b>Blank (4100637-BLK1)</b>											
Extracted: 10/13/04 10:47											
Benzene	EPA 8260B	ND	---	0.500	ug/l	1x	--	--	--	--	10/13/04 13:49
Toluene	"	ND	---	0.500	"	"	--	--	--	--	"
Ethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	"
Xylenes (total)	"	ND	---	1.00	"	"	--	--	--	--	"
Surrogate(s): 4-BFB Recovery: 90.0% Limits: 75-120% " 10/13/04 13:49											
1,2-DCA-d4 93.5% 77-129% "											
Dibromofluoromethane 92.0% 80-121% "											
Toluene-d8 93.5% 80-120% "											

<b>LCS (4100637-BS1)</b>											
Extracted: 10/13/04 10:47											
Benzene	EPA 8260B	20.1	---	0.500	ug/l	1x	--	20.0	100% (80-120)	--	10/13/04 11:58
Toluene	"	19.8	---	0.500	"	"	--	"	99.0% (80-124)	--	"
Ethylbenzene	"	21.5	---	0.500	"	"	--	"	108% (80-120)	--	"
Xylenes (total)	"	64.2	---	1.00	"	"	--	60.0	107% (73-124)	--	"
Surrogate(s): 4-BFB Recovery: 100% Limits: 75-120% " 10/13/04 11:58											
1,2-DCA-d4 95.0% 77-129% "											
Dibromofluoromethane 99.0% 80-121% "											
Toluene-d8 98.5% 80-120% "											

<b>Matrix Spike (4100637-MS1)</b>											
QC Source: P4J0465-14 Extracted: 10/13/04 10:47											
Benzene	EPA 8260B	20.1	---	0.500	ug/l	1x	ND	20.0	100% (80-124)	--	10/13/04 12:26
Toluene	"	19.7	---	0.500	"	"	ND	"	98.5% (79.7-131)	--	"
Ethylbenzene	"	20.6	---	0.500	"	"	ND	"	103% (80-124)	--	"
Xylenes (total)	"	60.9	---	1.00	"	"	ND	60.0	102% (44.6-154)	--	"
Surrogate(s): 4-BFB Recovery: 99.5% Limits: 75-120% " 10/13/04 12:26											
1,2-DCA-d4 98.0% 77-129% "											
Dibromofluoromethane 104% 80-121% "											
Toluene-d8 104% 80-120% "											

<b>Matrix Spike Dup (4100637-MSD1)</b>											
QC Source: P4J0465-14 Extracted: 10/13/04 10:47											
Benzene	EPA 8260B	19.8	---	0.500	ug/l	1x	ND	20.0	99.0% (80-124)	1.50% (25)	10/13/04 12:53
Toluene	"	19.1	---	0.500	"	"	ND	"	95.5% (79.7-131)	3.09% "	"
Ethylbenzene	"	21.1	---	0.500	"	"	ND	"	106% (80-124)	2.40% "	"
Xylenes (total)	"	63.0	---	1.00	"	"	ND	60.0	105% (44.6-154)	3.39% "	"
Surrogate(s): 4-BFB Recovery: 104% Limits: 75-120% " 10/13/04 12:53											
1,2-DCA-d4 98.5% 77-129% "											
Dibromofluoromethane 102% 80-121% "											
Toluene-d8 103% 80-120% "											

North Creek Analytical - Portland

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*Sarah Rissage*

Sarah Rissage, Project Manager

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: 100-1868

Project Manager: Gerry Koschal

Report Created:

10/19/04 15:36

**Polynuclear Aromatic Compounds per EPA 8270M-SIM - Laboratory Quality Control Results**  
**North Creek Analytical - Portland**

QC Batch: 4100552 Water Preparation Method: EPA 3510/600 Series

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	-------	----------	-------	----------	----------	-------

**Blank (4100552-BLK1)**

Extracted: 10/12/04 07:49

Acenaphthene	EPA 8270m	ND	---	0.100	ug/l	1x	--	--	--	--	--	--	10/12/04 21:53	
Acenaphthylene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Anthracene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (a) anthracene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (a) pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (b) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (ghi) perylene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (k) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Chrysene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Dibenzo (a,h) anthracene	"	ND	---	0.200	"	"	--	--	--	--	--	--	"	
Fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Fluorene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Indeno (1,2,3-cd) pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Naphthalene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Phenanthrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	

Surrogate(s): Fluorene-d10

Recovery: 95.2%

Limits: 25-125%

10/12/04 21:53

Pyrene-d10

90.8%

23-150%

"

Benzo (a) pyrene-d12

89.2%

10-125%

"

**LCS (4100552-BS1)**

Extracted: 10/12/04 07:49

Acenaphthene	EPA 8270m	2.01	---	0.100	ug/l	1x	--	2.50	80.4%	(26-135)	--	--	10/12/04 22:29	
Benzo (a) pyrene	"	2.08	---	0.100	"	"	--	"	83.2%	(38-137)	--	--	"	
Pyrene	"	2.24	---	0.100	"	"	--	"	89.6%	(33-133)	--	--	"	

Surrogate(s): Fluorene-d10

Recovery: 98.0%

Limits: 25-125%

10/12/04 22:29

Pyrene-d10

92.0%

23-150%

"

Benzo (a) pyrene-d12

88.8%

10-125%

"

**LCS Dup (4100552-BSD1)**

Extracted: 10/12/04 07:49

Acenaphthene	EPA 8270m	1.70	---	0.100	ug/l	1x	--	2.50	68.0%	(26-135)	16.7%	(60)	10/12/04 23:05	
Benzo (a) pyrene	"	1.98	---	0.100	"	"	--	"	79.2%	(38-137)	4.93%	"	"	
Pyrene	"	2.10	---	0.100	"	"	--	"	84.0%	(33-133)	6.45%	"	"	

Surrogate(s): Fluorene-d10

Recovery: 78.8%

Limits: 25-125%

10/12/04 23:05

Pyrene-d10

81.2%

23-150%

"

Benzo (a) pyrene-d12

79.2%

10-125%

"

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Sarah Essarge, Project Manager

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**SAIC**

1220 SW Morrison Suite 500  
Portland, OR 97205

Project Name: **CVX Willbridge / Chevron #100-1868**

Project Number: 100-1868

Project Manager: Gerry Koschal

Report Created

10/19/04 15:36

**Notes and Definitions**Report Specific Notes:

Q-06 - RPD is not applicable for analyte concentrations less than 5 times the MRL.

Laboratory Reporting Conventions:

DET Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.

ND Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).

NR NA Not Reported Not Available

dry Sample results reported on dry weight basis Reporting Limits are corrected for %Solids when %Solids are <50%.

wet Sample results and reporting limits reported on wet weight basis (as received).

RPD Relative Percent Difference (RPDs calculated using Results, not Percent Recoveries).

MRL METHOD REPORTING LIMIT Reporting Level at, or above, the lowest level standard of the Calibration Table.

MDL\* METHOD DETECTION LIMIT Reporting Level at, or above, the statistically derived limit based on 40 CFR, Part 136, Appendix B  
\*MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are as Estimated results.

Dil Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the value found on the analytical raw data.

Reporting limits - Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.

North Creek Analytical - Portland

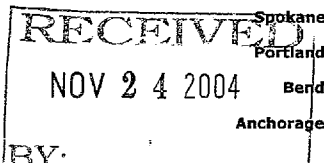
Sarah Essarge, Project Manager

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**  
Project Number: PTWB-02  
Project Manager: Kelly Kline

Report Created:  
10/14/04 16:26

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B-35	P4I1267-01	Water	09/28/04 14:25	09/29/04 11:25
B-36	P4I1267-02	Water	09/28/04 15:00	09/29/04 11:25
B-37	P4I1267-03	Water	09/28/04 15:25	09/29/04 11:25
P-1	P4I1267-04	Water	09/28/04 16:00	09/29/04 11:25
P-2	P4I1267-05	Water	09/28/04 14:10	09/29/04 11:25
U-2	P4I1267-06	Water	09/28/04 12:35	09/29/04 11:25
U-5	P4I1267-07	Water	09/28/04 15:45	09/29/04 11:25
U-10	P4I1267-08	Water	09/28/04 13:20	09/29/04 11:25
U-11	P4I1267-09	Water	09/28/04 13:55	09/29/04 11:25
U-12	P4I1267-10	Water	09/28/04 13:45	09/29/04 11:25
B-36-Dup	P4I1267-11	Water	09/28/04 15:00	09/29/04 11:25
U-13	P4I1267-12	Water	09/28/04 12:50	09/29/04 11:25

North Creek Analytical - Portland

Sarah Passarge, Project Manager

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:  
10/14/04 16:26

**BTEX per EPA Method 8021B**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1267-01</b>	<b>Water</b>	<b>B-35</b>	<b>Sampled: 09/28/04 14:25</b>							
<b>Benzene</b>	EPA 8021B	<b>93.4</b>	----	5.00	ug/l	10x	4100079	10/03/04	10/03/04 14:31	
<b>Toluene</b>	"	<b>11.7</b>	----	5.00	"	"	"	"	"	
<b>Ethylbenzene</b>	"	<b>ND</b>	----	5.00	"	"	"	"	"	
<b>Xylenes (total)</b>	"	<b>19.7</b>	----	10.0	"	"	"	"	"	
<i>Surrogate(s): 4-BFB (PID) Recovery: 107% Limits: 70 - 130 % 1X</i>										
<b>P4I1267-02</b>	<b>Water</b>	<b>B-36</b>	<b>Sampled: 09/28/04 15:00</b>							
<b>Benzene</b>	EPA 8021B	<b>0.614</b>	----	0.500	ug/l	1x	4100079	10/03/04	10/03/04 15:55	
<b>Toluene</b>	"	<b>0.679</b>	----	0.500	"	"	"	"	"	
<b>Ethylbenzene</b>	"	<b>ND</b>	----	0.500	"	"	"	"	"	
<b>Xylenes (total)</b>	"	<b>ND</b>	----	1.00	"	"	"	"	"	
<i>Surrogate(s): 4-BFB (PID) Recovery: 120% Limits: 70 - 130 % "</i>										
<b>P4I1267-03</b>	<b>Water</b>	<b>B-37</b>	<b>Sampled: 09/28/04 15:25</b>							
<b>Benzene</b>	EPA 8021B	<b>ND</b>	----	0.500	ug/l	1x	4100079	10/03/04	10/03/04 16:23	
<b>Toluene</b>	"	<b>ND</b>	----	0.500	"	"	"	"	"	
<b>Ethylbenzene</b>	"	<b>ND</b>	----	0.500	"	"	"	"	"	
<b>Xylenes (total)</b>	"	<b>ND</b>	----	1.00	"	"	"	"	"	
<i>Surrogate(s): 4-BFB (PID) Recovery: 104% Limits: 70 - 130 % "</i>										

North Creek Analytical - Portland

Sarah Passarge, Project Manager

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North Creek Analytical, Inc.  
Environmental Laboratory Network



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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:  
10/14/04 16:26

**BTEX per EPA Method 8021B****North Creek Analytical - Portland**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4I1267-04	Water	P-1	Sampled: 09/28/04 16:00							
Benzene	EPA 8021B	ND	----	0.500	ug/l	1x	4100079	10/03/04	10/03/04 16:50	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 101%		Limits: 70 - 130 %		"		"		
P4I1267-05RE1	Water	P-2	Sampled: 09/28/04 14:10							
Benzene	EPA 8021B	ND	----	0.500	ug/l	1x	4100193	10/05/04	10/06/04 06:16	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 102%		Limits: 70 - 130 %		"		"		
P4I1267-06	Water	U-2	Sampled: 09/28/04 12:35							
Benzene	EPA 8021B	ND	----	0.500	ug/l	1x	4100079	10/03/04	10/03/04 17:46	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 102%		Limits: 70 - 130 %		"		"		

North Creek Analytical - Portland

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**BTEX per EPA Method 8021B**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4I1267-07RE1	Water	U-5	Sampled: 09/28/04 15:45							
Benzene	EPA 8021B	ND	----	0.500	ug/l	1x	4100193	10/05/04	10/06/04 06:44	
Toluene	"	0.806	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	1.80	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 111%		Limits: 70 - 130 %		"		"		
P4I1267-08	Water	U-10	Sampled: 09/28/04 13:20							
Benzene	EPA 8021B	ND	----	0.500	ug/l	1x	4100079	10/03/04	10/03/04 19:37	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 100%		Limits: 70 - 130 %		"		"		
P4I1267-09RE1	Water	U-11	Sampled: 09/28/04 13:55							
Benzene	EPA 8021B	ND	----	0.500	ug/l	1x	4100193	10/05/04	10/06/04 07:12	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 98.2%		Limits: 70 - 130 %		"		"		

North Creek Analytical - Portland

Sarah Passarge, Project Manager

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Environmental Laboratory Network

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:  
10/14/04 16:26

**BTEX per EPA Method 8021B**

**North Creek Analytical - Portland**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4I1267-10RE1	Water	U-12	Sampled: 09/28/04 13:45							
Benzene	EPA 8021B	1.03	----	0.500	ug/l	1x	4100193	10/05/04	10/06/04 07:39	
Toluene	"	0.978	----	0.500	"	"	"	"	"	
Ethylbenzene	"	0.719	----	0.500	"	"	"	"	"	
Xylenes (total)	"	2.58	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 123%		Limits: 70 - 130 %		"		"		
P4I1267-11	Water	B-36-Dup	Sampled: 09/28/04 15:00							
Benzene	EPA 8021B	0.689	----	0.500	ug/l	1x	4100079	10/03/04	10/03/04 21:00	
Toluene	"	0.724	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 120%		Limits: 70 - 130 %		"		"		
P4I1267-12RE1	Water	U-13	Sampled: 09/28/04 12:50							
Benzene	EPA 8021B	39.7	----	0.500	ug/l	1x	4100193	10/05/04	10/06/04 08:07	
Toluene	"	6.20	----	0.500	"	"	"	"	"	
Ethylbenzene	"	14.3	----	0.500	"	"	"	"	"	
Xylenes (total)	"	11.3	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 197%		Limits: 70 - 130 %		"		"		S-02

North Creek Analytical - Portland

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Sarah Passarge, Project Manager

**North Creek Analytical, Inc.**  
**Environmental Laboratory Network**

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**COP0021096**



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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:  
10/14/04 16:26

**Total Metals per EPA 6000/7000 Series Methods****North Creek Analytical - Portland**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1267-01</b>	<b>Water</b>	<b>B-35</b>	<b>Sampled: 09/28/04 14:25</b>							
Arsenic	EPA 6020	0.0422	----	0.00100	mg/l	1x	4100198	10/05/04	10/09/04 23:03	
Barium	"	0.182	----	0.00100	"	"	"	"	10/12/04 06:14	
Cadmium	"	ND	----	0.00100	"	"	"	"	10/09/04 23:03	
Chromium	"	0.00829	----	0.00100	"	"	"	"	"	
Lead	"	0.00993	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	0.00171	----	0.000200	"	"	4100054	10/01/04	10/03/04 16:53	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100198	10/05/04	10/12/04 06:14	
Silver	"	ND	----	0.00100	"	"	"	"	10/09/04 23:03	
<b>P4I1267-02</b>	<b>Water</b>	<b>B-36</b>	<b>Sampled: 09/28/04 15:00</b>							
Arsenic	EPA 6020	0.0233	----	0.00100	mg/l	1x	4100198	10/05/04	10/09/04 23:19	
Barium	"	0.112	----	0.00100	"	"	"	"	10/12/04 06:54	
Cadmium	"	ND	----	0.00100	"	"	"	"	10/09/04 23:19	
Chromium	"	0.00349	----	0.00100	"	"	"	"	"	
Lead	"	0.00120	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	0.000285	----	0.000200	"	"	4100054	10/01/04	10/03/04 16:57	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100198	10/05/04	10/13/04 04:02	
Silver	"	ND	----	0.00100	"	"	"	"	10/09/04 23:19	
<b>P4I1267-03</b>	<b>Water</b>	<b>B-37</b>	<b>Sampled: 09/28/04 15:25</b>							
Arsenic	EPA 6020	0.131	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 04:19	
Barium	"	0.0784	----	0.00100	"	"	"	"	10/12/04 07:11	
Cadmium	"	ND	----	0.00100	"	"	"	"	10/13/04 19:13	
Chromium	"	0.00218	----	0.00100	"	"	"	"	"	
Lead	"	ND	----	0.00100	"	"	"	"	10/12/04 07:11	
Mercury	EPA 7470A	ND	----	0.000200	"	"	4100054	10/01/04	10/03/04 16:59	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100198	10/05/04	10/13/04 04:19	
Silver	"	ND	----	0.00100	"	"	"	"	"	

North Creek Analytical - Portland

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Sarah Passarge, Project Manager

North Creek Analytical, Inc.  
Environmental Laboratory Network



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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**Total Metals per EPA 6000/7000 Series Methods****North Creek Analytical - Portland**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1267-05</b>	<b>Water</b>	<b>P-2</b>	<b>Sampled: 09/28/04 14:10</b>							
Arsenic	EPA 6020	0.0103	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 04:35	
Barium	"	0.163	----	0.00100	"	"	"	"	10/12/04 07:35	
Cadmium	"	ND	----	0.00100	"	"	"	"	10/13/04 19:37	
Chromium	"	0.00570	----	0.00100	"	"	"	"	10/13/04 04:35	
Lead	"	0.00742	----	0.00100	"	"	"	"	10/12/04 07:35	
Mercury	EPA 7470A	0.000214	----	0.000200	"	"	4100054	10/01/04	10/03/04 17:02	
Selenium	EPA 6020	0.00103	----	0.00100	"	"	4100198	10/05/04	10/13/04 04:35	
Silver	"	ND	----	0.00100	"	"	"	"	"	
<b>P4I1267-06</b>	<b>Water</b>	<b>U-2</b>	<b>Sampled: 09/28/04 12:35</b>							
Arsenic	EPA 6020	0.0111	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 04:43	
Barium	"	0.0762	----	0.00100	"	"	"	"	10/12/04 07:44	
Cadmium	"	ND	----	0.00100	"	"	"	"	10/13/04 19:46	
Chromium	"	0.00318	----	0.00100	"	"	"	"	10/13/04 04:43	
Lead	"	0.00282	----	0.00100	"	"	"	"	10/12/04 07:44	
Mercury	EPA 7470A	ND	----	0.000200	"	"	4100054	10/01/04	10/03/04 17:05	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100198	10/05/04	10/13/04 04:43	
Silver	"	ND	----	0.00100	"	"	"	"	"	
<b>P4I1267-07</b>	<b>Water</b>	<b>U-5</b>	<b>Sampled: 09/28/04 15:45</b>							
Arsenic	EPA 6020	0.00987	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 04:51	
Barium	"	0.103	----	0.00100	"	"	"	"	10/12/04 07:52	
Cadmium	"	ND	----	0.00100	"	"	"	"	10/13/04 19:54	
Chromium	"	0.00623	----	0.00100	"	"	"	"	10/13/04 04:51	
Lead	"	0.0106	----	0.00100	"	"	"	"	10/12/04 07:52	
Mercury	EPA 7470A	0.000228	----	0.000200	"	"	4100054	10/01/04	10/03/04 17:07	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100198	10/05/04	10/13/04 04:51	
Silver	"	ND	----	0.00100	"	"	"	"	"	

North Creek Analytical - Portland

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Sarah Passarge, Project Manager

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:  
10/14/04 16:26

**Total Metals per EPA 6000/7000 Series Methods****North Creek Analytical - Portland**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1267-08</b>	<b>Water</b>	<b>U-10</b>	<b>Sampled: 09/28/04 13:20</b>							
Arsenic	EPA 6020	0.00657	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 05:32	
Barium	"	0.201	----	0.00100	"	"	"	"	10/12/04 08:08	
Cadmium	"	ND	----	0.00100	"	"	"	"	10/13/04 05:32	
Chromium	"	0.00966	----	0.00100	"	"	"	"	"	
Lead	"	0.00852	----	0.00100	"	"	"	"	10/12/04 08:08	
Mercury	EPA 7470A	ND	----	0.000200	"	"	4100054	10/01/04	10/03/04 17:10	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100198	10/05/04	10/13/04 05:32	
Silver	"	ND	----	0.00100	"	"	"	"	"	
<b>P4I1267-09</b>	<b>Water</b>	<b>U-11</b>	<b>Sampled: 09/28/04 13:55</b>							
Arsenic	EPA 6020	0.0106	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 05:40	
Barium	"	0.534	----	0.00100	"	"	"	"	10/12/04 08:41	
Cadmium	"	ND	----	0.00100	"	"	"	"	10/13/04 05:40	
Chromium	"	0.0561	----	0.00100	"	"	"	"	"	
Lead	"	0.0684	----	0.00100	"	"	"	"	10/12/04 08:41	
Mercury	EPA 7470A	0.000472	----	0.000200	"	"	4100054	10/01/04	10/03/04 17:13	
Selenium	EPA 6020	0.00192	----	0.00100	"	"	4100198	10/05/04	10/13/04 05:40	
Silver	"	ND	----	0.00100	"	"	"	"	"	
<b>P4I1267-10</b>	<b>Water</b>	<b>U-12</b>	<b>Sampled: 09/28/04 13:45</b>							
Arsenic	EPA 6020	0.0369	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 05:48	
Barium	"	0.208	----	0.00100	"	"	"	"	10/12/04 08:49	
Cadmium	"	ND	----	0.00100	"	"	"	"	10/13/04 05:48	
Chromium	"	0.0102	----	0.00100	"	"	"	"	"	
Lead	"	0.0499	----	0.00100	"	"	"	"	10/12/04 08:49	
Mercury	EPA 7470A	ND	----	0.000200	"	"	4100054	10/01/04	10/03/04 17:21	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100198	10/05/04	10/13/04 05:48	
Silver	"	ND	----	0.00100	"	"	"	"	"	

North Creek Analytical - Portland

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Sarah Passarge, Project Manager

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**Total Metals per EPA 6000/7000 Series Methods**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1267-11</b>	<b>Water</b>	<b>B-36-Dup</b>	<b>Sampled: 09/28/04 15:00</b>							
Arsenic	EPA 6020	0.0221	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 05:56	
Barium	"	0.0814	----	0.00100	"	"	"	"	"	
Cadmium	"	ND	----	0.00100	"	"	"	"	"	
Chromium	"	0.00222	----	0.00100	"	"	"	"	"	
Lead	"	ND	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	ND	----	0.000200	"	"	4100054	10/01/04	10/03/04 17:24	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100198	10/05/04	10/13/04 05:56	
Silver	"	ND	----	0.00100	"	"	"	"	"	
<b>P4I1267-12</b>	<b>Water</b>	<b>U-13</b>	<b>Sampled: 09/28/04 12:50</b>							
Arsenic	EPA 6020	0.0369	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 06:05	
Barium	"	1.22	----	0.00313	"	3.13x	"	"	10/13/04 06:13	R-02
Cadmium	"	ND	----	0.00100	"	1x	"	"	10/13/04 06:05	
Chromium	"	0.180	----	0.00100	"	"	"	"	"	
Lead	"	0.137	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	0.000292	----	0.000200	"	"	4100054	10/01/04	10/03/04 17:26	
Selenium	EPA 6020	0.00182	----	0.00100	"	"	4100198	10/05/04	10/13/04 06:05	
Silver	"	0.00108	----	0.00100	"	"	"	"	"	

North Creek Analytical - Portland

Sarah Passarge, Project Manager

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:  
10/14/04 16:26**Polynuclear Aromatic Compounds per EPA 8270M-SIM****North Creek Analytical - Portland**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P411267-01</b>	<b>Water</b>	<b>B-35</b>	<b>Sampled: 09/28/04 14:25</b>							<b>R-05</b>
Acenaphthene	EPA 8270m	5.25	----	0.200	ug/l	2x	4100099	10/04/04	10/08/04 15:49	
Acenaphthylene	"	ND	----	0.200	"	"	"	"	"	
Anthracene	"	0.579	----	0.200	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.200	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.200	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.200	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.200	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.200	"	"	"	"	"	
Chrysene	"	ND	----	0.200	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.400	"	"	"	"	"	
Fluoranthene	"	0.662	----	0.200	"	"	"	"	"	
Fluorene	"	9.23	----	0.200	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.200	"	"	"	"	"	
Naphthalene	"	ND	----	2.70	"	"	"	"	"	R-03
Phenanthrene	"	6.80	----	0.200	"	"	"	"	"	
Pyrene	"	0.455	----	0.200	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 60.9%		Limits: 25 - 125 %		"				
Pyrene-d10		65.6%		23 - 150 %		"				
Benzo (a) pyrene-d12		37.1%		10 - 125 %		"				

North Creek Analytical - Portland

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7150 SW Hampton - Suite 220  
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Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:  
10/14/04 16:26

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P411267-02	Water	B-36	Sampled: 09/28/04 15:00							
Acenaphthene	EPA 8270m	0.653	----	0.100	ug/l	1x	4100099	10/04/04	10/08/04 16:23	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Fluorene	"	1.51	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	1.60	"	"	"	"	"	R-03
Phenanthrene	"	ND	----	0.100	"	"	"	"	"	
Pyrene	"	ND	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 77.9%		Limits: 25 - 125 %		"			"	
Pyrene-d10		71.1%		23 - 150 %		"			"	
Benzo (a) pyrene-d12		81.0%		10 - 125 %		"			"	

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**Delta Environmental Consultants - Tigard**

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Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:  
10/14/04 16:26

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4I1267-03	Water	B-37	Sampled: 09/28/04 15:25							
Acenaphthene	EPA 8270m	0.142	----	0.100	ug/l	1x	4100099	10/04/04	10/08/04 16:57	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Fluorene	"	ND	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	0.300	"	"	"	"	"	R-03
Phenanthrene	"	ND	----	0.100	"	"	"	"	"	
Pyrene	"	ND	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 93.0%		Limits: 25 - 125 %	"				"	
Pyrene-d10		78.5%		23 - 150 %	"				"	
Benzo (a) pyrene-d12		81.5%		10 - 125 %	"				"	

North Creek Analytical - Portland

Sarah Passarge, Project Manager

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**Delta Environmental Consultants - Tigard**

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Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1267-05</b>	<b>Water</b>	<b>P-2</b>	<b>Sampled: 09/28/04 14:10</b>							<b>R-05</b>
<b>Acenaphthene</b>	EPA 8270m	<b>2.28</b>	----	0.200	ug/l	2x	4100099	10/04/04	10/08/04 17:31	
Acenaphthylene	"	ND	----	0.200	"	"	"	"	"	
Anthracene	"	ND	----	0.200	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.200	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.200	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.200	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.200	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.200	"	"	"	"	"	
Chrysene	"	ND	----	0.200	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.400	"	"	"	"	"	
Fluoranthene	"	ND	----	0.200	"	"	"	"	"	
<b>Fluorene</b>	"	<b>8.23</b>	----	0.200	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.200	"	"	"	"	"	
Naphthalene	"	ND	----	1.40	"	"	"	"	"	<b>R-03</b>
<b>Phenanthrene</b>	"	<b>3.56</b>	----	0.200	"	"	"	"	"	
Pyrene	"	ND	----	0.200	"	"	"	"	"	
<i>Surrogate(s): Fluorene-d10</i>		<i>Recovery: 74.6%</i>		<i>Limits: 25 - 125 %</i>		"			"	
<i>Pyrene-d10</i>		<i>67.2%</i>		<i>23 - 150 %</i>		"			"	
<i>Benzo (a) pyrene-d12</i>		<i>48.4%</i>		<i>10 - 125 %</i>		"			"	

North Creek Analytical - Portland

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Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:  
10/14/04 16:26

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P411267-06	Water	U-2	Sampled: 09/28/04 12:35							
Acenaphthene	EPA 8270m	ND	----	0.100	ug/l	1x	4100099	10/04/04	10/08/04 18:04	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Fluorene	"	ND	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	0.150	"	"	"	"	"	R-03
Phenanthrene	"	ND	----	0.100	"	"	"	"	"	
Pyrene	"	ND	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 95.4%		Limits: 25 - 125 %	"				"	
Pyrene-d10		80.0%		23 - 150 %	"				"	
Benzo (a) pyrene-d12		72.5%		10 - 125 %	"				"	

North Creek Analytical - Portland

Sarah Passarge, Project Manager

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Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4I1267-07	Water	U-5	Sampled: 09/28/04 15:45							R-05
Acenaphthene	EPA 8270m	4.54	----	0.500	ug/l	5x	4100099	10/04/04	10/08/04 18:38	
Acenaphthylene	"	ND	----	0.500	"	"	"	"	"	
Anthracene	"	ND	----	0.500	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.500	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.500	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.500	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.500	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.500	"	"	"	"	"	
Chrysene	"	ND	----	0.500	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	1.00	"	"	"	"	"	
Fluoranthene	"	ND	----	0.500	"	"	"	"	"	
Fluorene	"	6.51	----	0.500	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.500	"	"	"	"	"	
Naphthalene	"	ND	----	3.25	"	"	"	"	"	R-03
Phenanthrene	"	5.66	----	0.500	"	"	"	"	"	
Pyrene	"	ND	----	0.500	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 82.0%	Limits: 25 - 125 %		"		"			
Pyrene-d10		77.7%	23 - 150 %		"		"			
Benzo (a) pyrene-d12		59.4%	10 - 125 %		"		"			

North Creek Analytical - Portland

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:  
10/14/04 16:26

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

**North Creek Analytical - Portland**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4H1267-08</b>	<b>Water</b>	<b>U-10</b>	<b>Sampled: 09/28/04 13:20</b>							
Acenaphthene	EPA 8270m	ND	----	0.100	ug/l	1x	4100099	10/04/04	10/08/04 19:12	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Fluorene	"	ND	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	0.100	"	"	"	"	"	
Phenanthrene	"	ND	----	0.100	"	"	"	"	"	
Pyrene	"	ND	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 103%		Limits: 25 - 125 %	"					"
Pyrene-d10		90.3%		23 - 150 %	"					"
Benzo (a) pyrene-d12		72.6%		10 - 125 %	"					"

North Creek Analytical - Portland

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
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Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4I1267-09	Water	U-11	Sampled: 09/28/04 13:55							R-01
Acenaphthene	EPA 8270m	ND	----	0.171	ug/l	1x	4100133	10/04/04	10/06/04 17:30	R-03
Acenaphthylene	"	ND	----	0.114	"	"	"	"	"	
Anthracene	"	ND	----	0.171	"	"	"	"	"	R-03
Benzo (a) anthracene	"	ND	----	0.114	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.114	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.114	"	"	"	"	"	R-08
Benzo (ghi) perylene	"	ND	----	0.114	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.114	"	"	"	"	"	R-08
Chrysene	"	0.114	----	0.114	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.229	"	"	"	"	"	
Fluoranthene	"	ND	----	0.286	"	"	"	"	"	R-03
Fluorene	"	ND	----	0.343	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.114	"	"	"	"	"	
Naphthalene	"	ND	----	0.343	"	"	"	"	"	R-03
Phenanthrene	"	ND	----	0.343	"	"	"	"	"	R-03
Pyrene	"	0.341	----	0.114	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 50.3%		Limits: 25 - 125 %		"		"		
Pyrene-d10		68.5%		23 - 150 %		"		"		
Benzo (a) pyrene-d12		42.0%		10 - 125 %		"		"		

North Creek Analytical - Portland

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
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Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P411267-10	Water	U-12	Sampled: 09/28/04 13:45							
Acenaphthene	EPA 8270m	1.21	----	0.100	ug/l	1x	4100133	10/04/04	10/06/04 18:02	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	0.304	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	0.193	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	R-08
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	R-08
Chrysene	"	0.153	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	0.616	----	0.100	"	"	"	"	"	
Fluorene	"	2.56	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	1.20	"	"	"	"	"	R-03
Phenanthrene	"	2.56	----	0.100	"	"	"	"	"	
Pyrene	"	0.832	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 70.8%		Limits: 25 - 125 %		"		"		
Pyrene-d10		88.0%		23 - 150 %		"		"		
Benzo (a) pyrene-d12		64.0%		10 - 125 %		"		"		

North Creek Analytical - Portland

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*Sarah Passarge*

Sarah Passarge, Project Manager

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Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4I1267-11	Water	B-36-Dup	Sampled: 09/28/04 15:00							
Acenaphthene	EPA 8270m	0.723	----	0.100	ug/l	1x	4100133	10/04/04	10/06/04 18:35	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Fluorene	"	1.24	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	1.35	"	"	"	"	"	R-03
Phenanthrene	"	ND	----	0.100	"	"	"	"	"	
Pyrene	"	ND	----	0.150	"	"	"	"	"	R-03
Surrogate(s): Fluorene-d10		Recovery: 71.0%		Limits: 25 - 125 %	"				"	
Pyrene-d10		100%		23 - 150 %	"				"	
Benzo (a) pyrene-d12		83.5%		10 - 125 %	"				"	

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Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1267-12</b>	<b>Water</b>	<b>U-13</b>	<b>Sampled: 09/28/04 12:50</b>							<b>R-05</b>
Acenaphthene	EPA 8270m	ND	----	1.50	ug/l	10x	4100133	10/04/04	10/07/04 15:23	R-03
Acenaphthylene	"	ND	----	1.00	"	"	"	"	"	R-03
Anthracene	"	1.30	----	0.200	"	2x	"	"	10/06/04 19:08	
Benzo (a) anthracene	"	1.76	----	0.200	"	"	"	"	"	
Benzo (a) pyrene	"	1.36	----	0.200	"	"	"	"	"	
Benzo (b) fluoranthene	"	1.13	----	0.200	"	"	"	"	"	
Benzo (ghi) perylene	"	0.663	----	0.200	"	"	"	"	"	
Benzo (k) fluoranthene	"	1.08	----	0.200	"	"	"	"	"	
Chrysene	"	1.31	----	0.200	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.400	"	"	"	"	"	
Fluoranthene	"	3.84	----	0.200	"	"	"	"	"	
Fluorene	"	1.54	----	1.00	"	10x	"	"	10/07/04 15:23	
Indeno (1,2,3-cd) pyrene	"	0.654	----	0.200	"	2x	"	"	10/06/04 19:08	
Naphthalene	"	11.5	----	1.00	"	10x	"	"	10/07/04 15:23	
Phenanthrene	"	4.44	----	0.200	"	2x	"	"	10/06/04 19:08	
Pyrene	"	3.51	----	0.200	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 71.4%		Limits: 25 - 125 %	10X				10/07/04 15:23	
Pyrene-d10		36.2%		23 - 150 %	2X				10/06/04 19:08	
Benzo (a) pyrene-d12		21.1%		10 - 125 %	"				"	

North Creek Analytical - Portland

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Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**BTEX per EPA Method 8021B - Laboratory Quality Control Results**

North Creek Analytical - Portland

QC Batch: 4100079

Water Preparation Method: EPA 5030B

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	-------	----------	-------	----------	----------	-------

**Blank (4100079-BLK1)**

Extracted: 10/03/04 11:13

Benzene	EPA 8021B	ND	---	0.500	ug/l	1x	--	--	--	--	--	--	10/03/04 12:46	
Toluene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Ethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Xylenes (total)	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	

Surrogate(s): 4-BFB (PID)

Recovery: 104%

Limits: 70-130%

1x

10/03/04 12:46

**LCS (4100079-BS1)**

Extracted: 10/03/04 11:13

Benzene	EPA 8021B	21.8	---	0.500	ug/l	1x	--	20.0	109%	(70-130)	--	--	10/03/04 14:03	
Toluene	"	22.1	---	0.500	"	"	--	"	110%	(76-129)	--	--	"	
Ethylbenzene	"	22.3	---	0.500	"	"	--	"	112%	(82-130)	--	--	"	
Xylenes (total)	"	65.1	---	1.00	"	"	--	60.0	108%	(76-130)	--	--	"	

Surrogate(s): 4-BFB (PID)

Recovery: 106%

Limits: 70-130%

1x

10/03/04 14:03

**Matrix Spike (4100079-MS1)**

QC Source: P4I1267-01

Extracted: 10/03/04 11:13

Benzene	EPA 8021B	297	---	5.00	ug/l	10x	93.4	200	102%	(65-144)	--	--	10/03/04 14:59	
Toluene	"	215	---	5.00	"	"	11.7	"	102%	(68-139)	--	--	"	
Ethylbenzene	"	216	---	5.00	"	"	ND	"	106%	(69-144)	--	--	"	
Xylenes (total)	"	639	---	10.0	"	"	19.7	600	103%	(60-144)	--	--	"	

Surrogate(s): 4-BFB (PID)

Recovery: 110%

Limits: 70-130%

1x

10/03/04 14:59

**Matrix Spike Dup (4100079-MSD1)**

QC Source: P4I1267-01

Extracted: 10/03/04 11:13

Benzene	EPA 8021B	289	---	5.00	ug/l	10x	93.4	200	97.8%	(65-144)	2.73% (20)		10/03/04 15:27	
Toluene	"	209	---	5.00	"	"	11.7	"	98.6%	(68-139)	2.83%	"	"	
Ethylbenzene	"	207	---	5.00	"	"	ND	"	102%	(69-144)	4.26%	"	"	
Xylenes (total)	"	625	---	10.0	"	"	19.7	600	101%	(60-144)	2.22%	"	"	

Surrogate(s): 4-BFB (PID)

Recovery: 110%

Limits: 70-130%

1x

10/03/04 15:27

North Creek Analytical - Portland

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Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**BTEX per EPA Method 8021B - Laboratory Quality Control Results**

North Creek Analytical - Portland

QC Batch: 4100193

Water Preparation Method: EPA 5030B

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC (Limits)	% RPD (Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	----------------	----------------	----------	-------

**Blank (4100193-BLK1)**

Extracted: 10/05/04 11:02

Benzene	EPA 8021B	ND	---	0.500	ug/l	1x	--	--	--	--	10/05/04 17:40	
Toluene	"	ND	---	0.500	"	"	--	--	--	--	"	
Ethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	"	
Xylenes (total)	"	ND	---	1.00	"	"	--	--	--	--	"	

Surrogate(s): 4-BFB (PID)

Recovery: 99.8%

Limits: 70-130% "

10/05/04 17:40

**LCS (4100193-BS1)**

Extracted: 10/05/04 11:02

Benzene	EPA 8021B	20.4	---	0.500	ug/l	1x	--	20.0	102% (70-130)	--	10/05/04 18:42	
Toluene	"	21.0	---	0.500	"	"	--	"	105% (76-129)	--	"	
Ethylbenzene	"	21.9	---	0.500	"	"	--	"	110% (82-130)	--	"	
Xylenes (total)	"	63.9	---	1.00	"	"	--	60.0	106% (76-130)	--	"	

Surrogate(s): 4-BFB (PID)

Recovery: 102%

Limits: 70-130% "

10/05/04 18:42

**Matrix Spike (4100193-MS1)**

QC Source: P411268-01

Extracted: 10/05/04 11:02

Benzene	EPA 8021B	19.9	---	0.500	ug/l	1x	3.03	20.0	84.4% (65-144)	--	10/05/04 20:33	
Toluene	"	19.6	---	0.500	"	"	0.576	"	95.1% (68-139)	--	"	
Ethylbenzene	"	20.3	---	0.500	"	"	ND	"	99.8% (69-144)	--	"	
Xylenes (total)	"	60.6	---	1.00	"	"	1.80	60.0	98.0% (60-144)	--	"	

Surrogate(s): 4-BFB (PID)

Recovery: 108%

Limits: 70-130% "

10/05/04 20:33

**Matrix Spike Dup (4100193-MSD1)**

QC Source: P411268-01

Extracted: 10/05/04 11:02

Benzene	EPA 8021B	20.1	---	0.500	ug/l	1x	3.03	20.0	85.4% (65-144)	1.00% (20)	10/05/04 21:00	
Toluene	"	19.6	---	0.500	"	"	0.576	"	95.1% (68-139)	0.00% "	"	
Ethylbenzene	"	20.4	---	0.500	"	"	ND	"	100% (69-144)	0.491% "	"	
Xylenes (total)	"	61.1	---	1.00	"	"	1.80	60.0	98.8% (60-144)	0.822% "	"	

Surrogate(s): 4-BFB (PID)

Recovery: 109%

Limits: 70-130% "

10/05/04 21:00

North Creek Analytical - Portland

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Sarah Passarge, Project Manager

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Environmental Laboratory Network

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**Seattle** 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244  
phone: (425) 420.9200 fax: (425) 420.9210  
**Spokane** East 11115 Montgomery, Suite B, Spokane, WA 99206-4776  
phone: (509) 924.9200 fax: (509) 924.9290  
**Portland** 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132  
phone: (503) 906.9200 fax: (503) 906.9210  
**Bend** 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711  
phone: (541) 383.9310 fax: 541.382.7588  
**Anchorage** 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119  
phone: (907) 563.9200 fax: (907) 563.9210

**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**Total Metals per EPA 6000/7000 Series Methods - Laboratory Quality Control Results****North Creek Analytical - Portland**

QC Batch: 4100054

Water Preparation Method: EPA 7470A

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	-------	----------	-------	----------	----------	-------

**Blank (4100054-BLK1)**

Extracted: 10/01/04 15:41

Mercury	EPA 7470A	ND	--	0.000200	mg/l	1x	--	--	--	--	--	--	10/03/04 16:14	
---------	-----------	----	----	----------	------	----	----	----	----	----	----	----	----------------	--

**LCS (4100054-BS1)**

Extracted: 10/01/04 15:41

Mercury	EPA 7470A	0.00464	--	0.000200	mg/l	1x	--	0.00500	92.8%	(85-115)	--	--	10/03/04 16:17	
---------	-----------	---------	----	----------	------	----	----	---------	-------	----------	----	----	----------------	--

**LCS Dup (4100054-BSD1)**

Extracted: 10/01/04 15:41

Mercury	EPA 7470A	0.00494	--	0.000200	mg/l	1x	--	0.00500	98.8%	(85-115)	6.26%	(20)	10/03/04 16:20	
---------	-----------	---------	----	----------	------	----	----	---------	-------	----------	-------	------	----------------	--

**Duplicate (4100054-DUP1)**

QC Source: P4I1084-01

Extracted: 10/01/04 15:41

Mercury	EPA 7470A	ND	--	0.000200	mg/l	1x	ND	--	--	--	NR	(20)	10/03/04 16:23	
---------	-----------	----	----	----------	------	----	----	----	----	----	----	------	----------------	--

**Matrix Spike (4100054-MS1)**

QC Source: P4I1084-01

Extracted: 10/01/04 15:41

Mercury	EPA 7470A	0.00509	--	0.000200	mg/l	1x	ND	0.00500	102%	(75-125)	--	--	10/03/04 16:25	
---------	-----------	---------	----	----------	------	----	----	---------	------	----------	----	----	----------------	--

**Matrix Spike Dup (4100054-MSD1)**

QC Source: P4I1084-01

Extracted: 10/01/04 15:41

Mercury	EPA 7470A	0.00507	--	0.000200	mg/l	1x	ND	0.00500	101%	(75-125)	0.394%	(20)	10/03/04 16:29	
---------	-----------	---------	----	----------	------	----	----	---------	------	----------	--------	------	----------------	--

QC Batch: 4100198

Water Preparation Method: EPA 200/3005

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	-------	----------	-------	----------	----------	-------

**Blank (4100198-BLK1)**

Extracted: 10/05/04 12:01

Arsenic	EPA 6020	ND	--	0.00100	mg/l	1x	--	--	--	--	--	--	10/09/04 22:38	
Barium	"	ND	--	0.00100	"	"	--	--	--	--	--	--	10/12/04 05:41	
Cadmium	"	ND	--	0.00100	"	"	--	--	--	--	--	--	10/09/04 22:38	
Chromium	"	ND	--	0.00100	"	"	--	--	--	--	--	--	"	
Lead	"	ND	--	0.00100	"	"	--	--	--	--	--	--	"	
Selenium	"	ND	--	0.00100	"	"	--	--	--	--	--	--	10/12/04 05:41	
Silver	"	ND	--	0.00100	"	"	--	--	--	--	--	--	10/09/04 22:38	

**LCS (4100198-BS1)**

Extracted: 10/05/04 12:01

Arsenic	EPA 6020	0.106	--	0.00100	mg/l	1x	--	0.100	106%	(80-120)	--	--	10/09/04 22:47	
Barium	"	0.116	--	0.00100	"	"	--	"	116%	"	--	--	10/12/04 05:49	
Cadmium	"	0.107	--	0.00100	"	"	--	"	107%	"	--	--	10/09/04 22:47	
Chromium	"	0.105	--	0.00100	"	"	--	"	105%	"	--	--	"	
Lead	"	0.101	--	0.00100	"	"	--	"	101%	"	--	--	"	
Selenium	"	0.0566	--	0.00100	"	"	--	0.0500	113%	"	--	--	10/12/04 05:49	
Silver	"	0.108	--	0.00100	"	"	--	0.100	108%	"	--	--	10/09/04 22:47	

North Creek Analytical - Portland

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**Total Metals per EPA 6000/7000 Series Methods - Laboratory Quality Control Results**

North Creek Analytical - Portland

QC Batch: 4100198

Water Preparation Method: EPA 200/3005

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC (Limits)	% RPD (Limits)	Analyzed	Notes
<b>LCS Dup (4100198-BSD1)</b>							Extracted: 10/05/04 12:01					
Arsenic	EPA 6020	0.108	---	0.00100	mg/l	1x	--	0.100	108% (80-120)	1.87% (20)	10/09/04 22:55	
Barium	"	0.118	---	0.00100	"	"	--	"	118%	1.71%	10/12/04 06:06	
Cadmium	"	0.108	---	0.00100	"	"	--	"	108%	0.930%	10/09/04 22:55	
Chromium	"	0.105	---	0.00100	"	"	--	"	105%	0.00%	"	
Lead	"	0.103	---	0.00100	"	"	--	"	103%	1.96%	"	
Selenium	"	0.0566	---	0.00100	"	"	--	0.0500	113%	0.00%	10/12/04 06:06	
Silver	"	0.109	---	0.00100	"	"	--	0.100	109%	0.922%	"	
<b>Duplicate (4100198-DUP1)</b>							QC Source: P411267-01 Extracted: 10/05/04 12:01					
Arsenic	EPA 6020	0.0465	---	0.00100	mg/l	1x	0.0422	--	--	9.70% (20)	10/09/04 23:11	
Barium	"	0.194	---	0.00100	"	"	0.182	--	--	6.38%	10/12/04 06:22	
Cadmium	"	ND	---	0.00100	"	"	ND	--	--	NR	10/09/04 23:11	
Chromium	"	0.0108	---	0.00100	"	"	0.00829	--	--	26.3%	"	Q-06
Lead	"	0.0105	---	0.00100	"	"	0.00993	--	--	5.58%	"	
Selenium	"	0.00154	---	0.00100	"	"	ND	--	--	NR	10/12/04 06:22	
Silver	"	0.0000700	---	0.00100	"	"	ND	--	--	NR	10/09/04 23:11	
<b>Matrix Spike (4100198-MS1)</b>							QC Source: P411267-02 Extracted: 10/05/04 12:01					
Arsenic	EPA 6020	0.130	---	0.00100	mg/l	1x	0.0233	0.100	107% (75-125)	--	10/13/04 04:10	
Barium	"	0.222	---	0.00100	"	"	0.112	"	110%	--	10/12/04 07:03	
Cadmium	"	0.103	---	0.00100	"	"	ND	"	103%	--	10/13/04 19:05	
Chromium	"	0.114	---	0.00100	"	"	0.00349	"	111%	--	10/13/04 04:10	
Lead	"	0.114	---	0.00100	"	"	0.00120	"	113%	--	10/12/04 07:03	
Selenium	"	0.0502	---	0.00100	"	"	ND	0.0500	100%	--	10/13/04 04:10	
Silver	"	0.104	---	0.00100	"	"	ND	0.100	104%	--	"	
<b>Matrix Spike (4100198-MS2)</b>							QC Source: P411267-03 Extracted: 10/05/04 12:01					
Arsenic	EPA 6020	0.246	---	0.00100	mg/l	1x	0.131	0.100	115% (75-125)	--	10/13/04 04:27	
Barium	"	0.191	---	0.00100	"	"	0.0784	"	113%	--	10/12/04 07:19	
Cadmium	"	0.108	---	0.00100	"	"	ND	"	108%	--	10/13/04 19:21	
Chromium	"	0.117	---	0.00100	"	"	0.00218	"	115%	--	10/13/04 04:27	
Lead	"	0.112	---	0.00100	"	"	ND	"	111%	--	10/12/04 07:19	
Selenium	"	0.0542	---	0.00100	"	"	ND	0.0500	108%	--	10/13/04 04:27	
Silver	"	0.107	---	0.00100	"	"	ND	0.100	107%	--	"	

North Creek Analytical - Portland

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

*Sarah Passarge*

Sarah Passarge, Project Manager

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**Portland** 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132  
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**Anchorage** 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119  
phone: (907) 563.9200 fax: (907) 563.9210

**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**Polynuclear Aromatic Compounds per EPA 8270M-SIM - Laboratory Quality Control Results****North Creek Analytical - Portland**

QC Batch: 4100099

Water Preparation Method: EPA 3520/600 Series

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC (Limits)	% RPD (Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	----------------	----------------	----------	-------

**Blank (4100099-BLK1)**

Extracted: 10/04/04 07:29

Acenaphthene	EPA 8270m	ND	---	0.100	ug/l	1x	--	--	--	--	10/08/04 14:40	
Acenaphthylene	"	ND	---	0.100	"	"	--	--	--	--	"	
Anthracene	"	ND	---	0.100	"	"	--	--	--	--	"	
Benzo (a) anthracene	"	ND	---	0.100	"	"	--	--	--	--	"	
Benzo (a) pyrene	"	ND	---	0.100	"	"	--	--	--	--	"	
Benzo (b) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	"	
Benzo (ghi) perylene	"	ND	---	0.100	"	"	--	--	--	--	"	
Benzo (k) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	"	
Chrysene	"	ND	---	0.100	"	"	--	--	--	--	"	
Dibenzo (a,h) anthracene	"	ND	---	0.200	"	"	--	--	--	--	"	
Fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	"	
Fluorene	"	ND	---	0.100	"	"	--	--	--	--	"	
Indeno (1,2,3-cd) pyrene	"	ND	---	0.100	"	"	--	--	--	--	"	
Naphthalene	"	ND	---	0.100	"	"	--	--	--	--	"	
Phenanthrene	"	ND	---	0.100	"	"	--	--	--	--	"	
Pyrene	"	ND	---	0.100	"	"	--	--	--	--	"	

Surrogate(s): Fluorene-d10

Recovery: 93.6%

Limits: 25-125%

"

10/08/04 14:40

Pyrene-d10

84.0%

23-150%

"

"

Benzo (a) pyrene-d12

81.6%

10-125%

"

"

**LCS (4100099-BS1)**

Extracted: 10/04/04 07:29

Acenaphthene	EPA 8270m	1.96	---	0.100	ug/l	1x	--	2.50	78.4% (26-135)	--	10/08/04 12:02	
Benzo (a) pyrene	"	2.04	---	0.100	"	"	--	"	81.6% (38-137)	--	"	
Pyrene	"	2.04	---	0.100	"	"	--	"	81.6% (33-133)	--	"	

Surrogate(s): Fluorene-d10

Recovery: 89.2%

Limits: 25-125%

"

10/08/04 12:02

Pyrene-d10

80.4%

23-150%

"

"

Benzo (a) pyrene-d12

82.0%

10-125%

"

"

**LCS Dup (4100099-BSD1)**

Extracted: 10/04/04 07:29

Acenaphthene	EPA 8270m	1.79	---	0.100	ug/l	1x	--	2.50	71.6% (26-135)	9.07% (60)	10/08/04 12:36	
Benzo (a) pyrene	"	2.19	---	0.100	"	"	--	"	87.6% (38-137)	7.09%	"	
Pyrene	"	2.13	---	0.100	"	"	--	"	85.2% (33-133)	4.32%	"	

Surrogate(s): Fluorene-d10

Recovery: 82.8%

Limits: 25-125%

"

10/08/04 12:36

Pyrene-d10

81.6%

23-150%

"

"

Benzo (a) pyrene-d12

85.2%

10-125%

"

"

North Creek Analytical - Portland

Sarah Passarge, Project Manager

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**Polynuclear Aromatic Compounds per EPA 8270M-SIM - Laboratory Quality Control Results**

North Creek Analytical - Portland

QC Batch: 4100133

Water Preparation Method: EPA 3510/600 Series

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (4100133-BLK1)														
Extracted: 10/04/04 11:33														
Acenaphthene	EPA 8270m	ND	---	0.100	ug/l	1x	--	--	--	--	--	--	10/06/04 13:06	
Acenaphthylene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Anthracene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (a) anthracene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (a) pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (b) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (ghi) perylene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Benzo (k) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Chrysene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Dibenzo (a,h) anthracene	"	ND	---	0.200	"	"	--	--	--	--	--	--	"	
Fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Fluorene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Indeno (1,2,3-cd) pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Naphthalene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Phenanthrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	
Pyrene	"	ND	---	0.100	"	"	--	--	--	--	--	--	"	

Surrogate(s): Fluorene-d10

Recovery: 74.4%

Limits: 25-125%

10/06/04 13:06

Pyrene-d10

87.6%

23-150%

"

Benzo (a) pyrene-d12

76.8%

10-125%

"

**LCS (4100133-BS1)**

Extracted: 10/04/04 11:33

Acenaphthene	EPA 8270m	1.95	---	0.100	ug/l	1x	--	2.50	78.0%	(26-135)	--	--	10/05/04 21:55
Benzo (a) pyrene	"	2.10	---	0.100	"	"	--	"	84.0%	(38-137)	--	--	"
Pyrene	"	2.33	---	0.100	"	"	--	"	93.2%	(33-133)	--	--	"

Surrogate(s): Fluorene-d10

Recovery: 70.0%

Limits: 25-125%

10/05/04 21:55

Pyrene-d10

89.2%

23-150%

"

Benzo (a) pyrene-d12

81.2%

10-125%

"

**LCS Dup (4100133-BSD1)**

Extracted: 10/04/04 11:33

Acenaphthene	EPA 8270m	2.02	---	0.100	ug/l	1x	--	2.50	80.8%	(26-135)	3.53% (60)	--	10/05/04 22:28
Benzo (a) pyrene	"	2.16	---	0.100	"	"	--	"	86.4%	(38-137)	2.82%	"	"
Pyrene	"	2.41	---	0.100	"	"	--	"	96.4%	(33-133)	3.38%	"	"

Surrogate(s): Fluorene-d10

Recovery: 73.6%

Limits: 25-125%

10/05/04 22:28

Pyrene-d10

88.4%

23-150%

"

Benzo (a) pyrene-d12

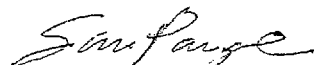
79.2%

10-125%

"

North Creek Analytical - Portland

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Sarah Passarge, Project Manager

North Creek Analytical, Inc.  
Environmental Laboratory Network

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Tosco #0608, Portland, OR**

Project Number: PTWB-02

Project Manager: Kelly Kline

Report Created:

10/14/04 16:26

**Notes and Definitions**

**Report Specific Notes:**

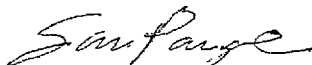
- Q-06 - RPD is not applicable for analyte concentrations less than 5 times the MRL.
- R-01 - The reporting limit for this analyte was raised to compensate for the limited sample quantity available for the analysis.
- R-02 - The reporting limit for this analyte was raised due to the high analyte concentration present in the sample.
- R-03 - The reporting limit for this analyte was raised due to matrix interference.
- R-05 - Reporting limits raised due to dilution necessary for analysis. Sample contains high levels of reported analyte, non-target analyte, and/or matrix interference.
- R-08 - Due to matrix unable to resolve Benzo(a)fluoranthene isomers. Value reported only in Benzo(b) category represents Total Benzo(b+k) fluoranthene.
- S-02 - The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present.

**Laboratory Reporting Conventions:**

- DET - Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
- ND - Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
- NR / NA - Not Reported / Not Available
- dry - Sample results reported on a dry weight basis. Reporting Limits are corrected for %Solids when %Solids are <50%.
- wet - Sample results and reporting limits reported on a wet weight basis (as received).
- RPD - Relative Percent Difference. (RPDs calculated using Results, not Percent Recoveries).
- MRL - METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
- MDL\* - METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. \*MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated results.
- Dil - Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
- Reporting limits - Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.

North Creek Analytical - Portland

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



Sarah Passarge, Project Manager

North Creek Analytical, Inc.  
Environmental Laboratory Network

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## TOSCO CHAIN OF CUSTODY REPORT

P4F1267

**TOSCO INFORMATION**

Facility Number: 0608

Site Address: 5528 NW Doane Ave

City, State, ZIP: Portland, OR 97210

Project/AWO Code

Tosco Manager: Marty Cramer

FACILITY TYPE: (check one) ☐ BP/OK ☒ Terminal/Bulk Plant

☐ Brown Bear ☐ Former 76 Site ☐ Other

**CONSULTANT INFORMATION**

Firm: Delta Project# PTWB-02

Address: Tigard

Phone: 503-639-8098 Fax:

Project Manager: K. Kline E-mail:

Sample Collection by: JMN/NWH

Quality Assurance Data Level:

☒ A ☐ B

A: Standard Summary

B: Standard + Chromatograms

Laboratory Turnaround Days:

☒ 5 ☐ 3 ☐ 2 ☐ 1

10 Day - Standard

SAMPLE IDENTIFICATION	SAMPLING DATE / TIME	MATRIX (W,S,O)	# OF CON-TAINERS
1. B-35	9-28-04/1425	W	6
2. B-36	1525		5
3. B-37	1525		5
4. P-1	1620		3
5. P-2	1410		6
6. U-2	1235		6
7. U-5	1545		5
8. U-10	1320		6
9. U-11	1355		6
10. U-12	1345		6

<input type="radio"/> OR	<input type="radio"/> WA	<input type="radio"/> AK	<input type="radio"/> NW Series	<input type="radio"/> ID															
TFH-HCID	TFH-Gas	BTEX	EPA 8021 Mod.	TFH-Gas + BTEX	TFH-Diesel	TFH-Diesel Extended	TFH-Diesel-Ext. w/SG Cleanup	Halogen. Volatiles	EPA 8021	Pesticides/PCBs or PCBs Only	GC/MS Volatiles	EPA 8260	GC/MS Semi Vols.	EPA 8270	PAH's: 8270 SIM or 8310	Lead:	Total or Dissolved	TFH or RCRA Metals (8)	Total
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X		X	X	X
		X	X	X										X	X				

NCA SAMPLE NUMBER

Relinquished by	Firm	Date & Time	Received by	Firm	Date & Time	Comments
1. <u>NCA</u>	<u>Delta</u>	<u>9/29/04</u>	<u>NCA</u>	<u>NCA</u>	<u>9/29/04 11:05</u>	
2. <u>NCA</u>	<u>NCA</u>	<u>9/29/04</u>	<u>Vamosa</u>	<u>NCA</u>	<u>9/29/04 11:25</u>	
3.						

Page 1 of 2

Rev. Tos3.3.2/99

Distribution: White - Laboratory Yellow - Consultant Photocopy - Tosco

115,22108



## TOSCO CHAIN OF CUSTODY REPORT

2471267

**TOSCO INFORMATION**

Facility Number: 0608  
Site Address: 5528 NW Dome Ave  
City, State, ZIP: PDx, OR 97210  
Project/AWO Code: \_\_\_\_\_  
Tosco Manager: Marty Cramer  
FACILITY TYPE: (check one) ☐ BP/® ☒ Terminal/Bulk Plant  
☐ Brown Bear ☐ Former 76 Site ☐ Other

**CONSULTANT INFORMATION**

Firm: Delta Project#: PTWB-02  
Address: Tigard  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Project Manager: K. Kline E-mail: \_\_\_\_\_  
Sample Collection by: NWH/JMN

Quality Assurance Data Level:

☒ A ☐ B

A: Standard Summary

B: Standard + Chromatograms

Laboratory Turnaround Days:

☒ 5 ☐ 3 ☐ 2 ☐ 1

10 Day - Standard

SAMPLE IDENTIFICATION	SAMPLING DATE / TIME	MATRIX (W,S,O)	# OF CON-TAINERS
1. <u>B-36-Dup</u>	<u>9-28-4/1500</u>	<u>W</u>	<u>5</u>
2. <u>U-13</u>	<u>9-28-4/1250</u>	<u>W</u>	<u>6</u>
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

OR	WA	AK	NW Series	ID
TFH-HCID	TFH-Gas	BTEX	EPA 8021 Mod	TPH-Gas + BTEX
		TPH-Diesel		
		TPH-Diesel Ex-nded		
		TPH-Diesel-Ext. w/SG Cleanup		
		Halogen Volatiles		
		EPA 8021 Pesticides/PCBs or PCBs Only		
		GC/MS Volatiles		
		EPA 8260		
		GC/MS Semi Vols.		
		EPA 8270		
		PA H's		
		8270 SIM or 8310		
		Let d:		
		Total or Dissolved		
		TCLP or RCRA		
		Metals (8)		

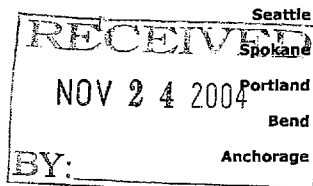
NCA SAMPLE NUMBER

Relinquished by:	Firm:	Date & Time	Received by:	Firm:	Date & Time	Comments:
1. <u>NWH/JMN</u>	<u>Delta</u>		<u>B. Kline</u>	<u>NCA</u>	<u>9/29/04 @ 11:05</u>	
2. <u>B. Kline</u>	<u>NCA</u>	<u>9/29/04 @ 11:25</u>	<u>V. Brown</u>	<u>NCA</u>	<u>9/29/04 @ 11:25</u>	
3. <u>V. Brown</u>						

Page 2 of 2  
Rev. Tus3.3.2/99  
Comments: \_\_\_\_\_  
Distribution: White - Laboratory Yellow - Consultant Photocopy - Tosco

1.5.2.2.1.8

COP0021120



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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-8	P4I1268-01	Water	09/27/04 17:10	09/29/04 11:25
MW-8-Dup	P4I1268-02	Water	09/27/04 17:10	09/29/04 11:25
MW-25	P4I1268-03	Water	09/27/04 16:45	09/29/04 11:25
MW-26	P4I1268-04	Water	09/27/04 16:30	09/29/04 11:25
MW-33	P4I1268-05	Water	09/27/04 18:30	09/29/04 11:25
MW-34	P4I1268-06	Water	09/27/04 19:30	09/29/04 11:25
MW-36	P4I1268-07	Water	09/27/04 18:00	09/29/04 11:25
MW-37	P4I1268-08	Water	09/27/04 20:00	09/29/04 11:25
MW-39	P4I1268-09	Water	09/27/04 17:40	09/29/04 11:25
MW-40	P4I1268-10	Water	09/27/04 19:00	09/29/04 11:25

North Creek Analytical - Portland

Sarah Passarge, Project Manager

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North Creek Analytical, Inc.  
Environmental Laboratory Network



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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**BTEX per EPA Method 8021B**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4I1268-01	Water	MW-8	Sampled: 09/27/04 17:10							
Benzene	EPA 8021B	3.03	----	0.500	ug/l	1x	4100193	10/05/04	10/05/04 20:05	
Toluene	"	0.576	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	1.80	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 110%		Limits: 70 - 130 %		"		"		
P4I1268-02	Water	MW-8-Dup	Sampled: 09/27/04 17:10							
Benzene	EPA 8021B	3.25	----	0.500	ug/l	1x	4100193	10/05/04	10/05/04 21:28	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	1.75	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 110%		Limits: 70 - 130 %		"		"		
P4I1268-03	Water	MW-25	Sampled: 09/27/04 16:45							
Benzene	EPA 8021B	ND	----	0.500	ug/l	1x	4100193	10/05/04	10/05/04 21:56	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 98.2%		Limits: 70 - 130 %		"		"		

North Creek Analytical - Portland

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Sarah Passarge, Project Manager

North Creek Analytical, Inc.  
Environmental Laboratory Network

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**BTEX per EPA Method 8021B**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4I1268-04RE1	Water	MW-26	Sampled: 09/27/04 16:30							
Benzene	EPA 8021B	2.41	----	0.500	ug/l	1x	4100309	10/06/04	10/06/04 22:05	
Toluene	"	1.42	----	0.500	"	"	"	"	"	
Ethylbenzene	"	4.64	----	0.500	"	"	"	"	"	
Xylenes (total)	"	7.57	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 123%		Limits: 70 - 130 %		"		"		
P4I1268-05	Water	MW-33	Sampled: 09/27/04 18:30							
Benzene	EPA 8021B	ND	----	0.500	ug/l	1x	4100193	10/05/04	10/05/04 23:47	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 96.0%		Limits: 70 - 130 %		"		"		
P4I1268-06	Water	MW-34	Sampled: 09/27/04 19:30							
Benzene	EPA 8021B	ND	----	0.500	ug/l	1x	4100193	10/05/04	10/06/04 00:15	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 97.0%		Limits: 70 - 130 %		"		"		

North Creek Analytical - Portland

Sarah Passarge, Project Manager

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North Creek Analytical, Inc.  
Environmental Laboratory Network

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phone: (907) 563.9200 fax: (907) 563.9210

**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**BTEX per EPA Method 8021B**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4I1268-07	Water	MW-36	Sampled: 09/27/04 18:00							
Benzene	EPA 8021B	ND	----	0.500	ug/l	1x	4100193	10/05/04	10/06/04 00:44	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 98.6%		Limits: 70 - 130 %		"		"		
P4I1268-08	Water	MW-37	Sampled: 09/27/04 20:00							
Benzene	EPA 8021B	ND	----	0.500	ug/l	1x	4100193	10/05/04	10/06/04 01:11	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 107%		Limits: 70 - 130 %		"		"		
P4I1268-09	Water	MW-39	Sampled: 09/27/04 17:40							
Benzene	EPA 8021B	ND	----	0.500	ug/l	1x	4100193	10/05/04	10/06/04 01:39	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	7.45	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 105%		Limits: 70 - 130 %		"		"		

North Creek Analytical - Portland

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Sarah Passarge, Project Manager

North Creek Analytical, Inc.  
Environmental Laboratory Network

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phone: (907) 563.9200 fax: (907) 563.9210

**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**BTEX per EPA Method 8021B**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4I1268-10	Water	MW-40	Sampled: 09/27/04 19:00							
Benzene	EPA 8021B	ND	----	0.500	ug/l	1x	4100193	10/05/04	10/06/04 02:06	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 100%		Limits: 70 - 130 %		"		"		

North Creek Analytical - Portland

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Sarah Passarge, Project Manager

North Creek Analytical, Inc.  
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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Total Metals per EPA 6000/7000 Series Methods**

**North Creek Analytical - Portland**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1268-01</b>	<b>Water</b>	<b>MW-8</b>	<b>Sampled: 09/27/04 17:10</b>							
Arsenic	EPA 6020	0.0160	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 06:21	
Barium	"	0.0858	----	0.00100	"	"	"	"	"	
Cadmium	"	0.00268	----	0.00100	"	"	"	"	"	
Chromium	"	0.00598	----	0.00100	"	"	"	"	"	
Copper	"	0.00898	----	0.00200	"	"	"	"	"	
Lead	"	0.00562	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	ND	----	0.000200	"	"	4100055	10/01/04	10/03/04 18:05	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100198	10/05/04	10/13/04 06:21	
Silver	"	ND	----	0.00100	"	"	"	"	"	
Zinc	"	0.0613	----	0.00500	"	"	"	"	"	
<b>P4I1268-02</b>	<b>Water</b>	<b>MW-8-Dup</b>	<b>Sampled: 09/27/04 17:10</b>							
Arsenic	EPA 6020	0.0167	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 06:29	
Barium	"	0.110	----	0.00100	"	"	"	"	"	
Cadmium	"	0.00395	----	0.00100	"	"	"	"	"	
Chromium	"	0.00454	----	0.00100	"	"	"	"	"	
Copper	"	0.0130	----	0.00200	"	"	"	"	"	
Lead	"	0.00705	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	ND	----	0.000200	"	"	4100055	10/01/04	10/03/04 18:07	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100198	10/05/04	10/13/04 06:29	
Silver	"	ND	----	0.00100	"	"	"	"	"	
Zinc	"	0.0888	----	0.00500	"	"	"	"	"	

North Creek Analytical - Portland

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:  
10/14/04 17:03

**Total Metals per EPA 6000/7000 Series Methods****North Creek Analytical - Portland**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1268-03</b>	<b>Water</b>	<b>MW-25</b>	<b>Sampled: 09/27/04 16:45</b>							
Arsenic	EPA 6020	0.0712	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 06:37	
Barium	"	0.140	----	0.00100	"	"	"	"	"	
Cadmium	"	ND	----	0.00100	"	"	"	"	"	
Chromium	"	0.00506	----	0.00100	"	"	"	"	"	
Copper	"	0.0112	----	0.00200	"	"	"	"	"	
Lead	"	0.0112	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	ND	----	0.000200	"	"	4100055	10/01/04	10/03/04 18:10	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100198	10/05/04	10/13/04 06:37	
Silver	"	ND	----	0.00100	"	"	"	"	"	
Zinc	"	0.0304	----	0.00500	"	"	"	"	"	
<b>P4I1268-04</b>	<b>Water</b>	<b>MW-26</b>	<b>Sampled: 09/27/04 16:30</b>							
Arsenic	EPA 6020	0.0657	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 06:45	
Barium	"	0.0662	----	0.00100	"	"	"	"	"	
Cadmium	"	ND	----	0.00100	"	"	"	"	"	
Chromium	"	0.00206	----	0.00100	"	"	"	"	"	
Copper	"	0.00448	----	0.00200	"	"	"	"	"	
Lead	"	0.00654	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	ND	----	0.000200	"	"	4100055	10/01/04	10/03/04 18:13	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100198	10/05/04	10/13/04 06:45	
Silver	"	ND	----	0.00100	"	"	"	"	"	
Zinc	"	0.0188	----	0.00500	"	"	"	"	"	

North Creek Analytical - Portland

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Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Total Metals per EPA 6000/7000 Series Methods****North Creek Analytical - Portland**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1268-05</b>	<b>Water</b>	<b>MW-33</b>	<b>Sampled: 09/27/04 18:30</b>							
Arsenic	EPA 6020	0.132	----	0.00200	mg/l	1x	4100198	10/05/04	10/13/04 20:34	
Barium	"	1.41	----	0.00200	"	"	"	"	"	
Cadmium	"	ND	----	0.00200	"	"	"	"	"	
Chromium	"	0.00628	----	0.00200	"	"	"	"	"	
Copper	"	0.0135	----	0.00400	"	"	"	"	"	
Lead	"	ND	----	0.00200	"	"	"	"	"	
Mercury	EPA 7470A	0.000490	----	0.000200	"	"	4100055	10/01/04	10/03/04 18:21	
Selenium	EPA 6020	ND	----	0.00200	"	"	4100198	10/05/04	10/13/04 20:34	
Silver	"	ND	----	0.00200	"	"	"	"	"	
Zinc	"	0.0319	----	0.0100	"	"	"	"	"	
<b>P4I1268-06</b>	<b>Water</b>	<b>MW-34</b>	<b>Sampled: 09/27/04 19:30</b>							
Arsenic	EPA 6020	0.0879	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 20:42	
Barium	"	0.355	----	0.00100	"	"	"	"	"	
Cadmium	"	ND	----	0.00100	"	"	"	"	"	
Chromium	"	0.0114	----	0.00100	"	"	"	"	"	
Copper	"	0.0285	----	0.00200	"	"	"	"	"	
Lead	"	0.0111	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	ND	----	0.000200	"	"	4100055	10/01/04	10/03/04 18:25	
Selenium	EPA 6020	0.00131	----	0.00100	"	"	4100198	10/05/04	10/13/04 20:42	
Silver	"	ND	----	0.00100	"	"	"	"	"	
Zinc	"	0.0547	----	0.00500	"	"	"	"	"	

North Creek Analytical - Portland

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Project Number: PTWB-03

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Report Created:

10/14/04 17:03

**Total Metals per EPA 6000/7000 Series Methods**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1268-07</b>	<b>Water</b>	<b>MW-36</b>	<b>Sampled: 09/27/04 18:00</b>							
Arsenic	EPA 6020	0.0320	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 20:51	
Barium	"	0.106	----	0.00100	"	"	"	"	"	
Cadmium	"	ND	----	0.00100	"	"	"	"	"	
Chromium	"	0.00238	----	0.00100	"	"	"	"	"	
Copper	"	0.00739	----	0.00200	"	"	"	"	"	
Lead	"	0.00334	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	ND	----	0.000200	"	"	4100055	10/01/04	10/03/04 18:27	
Selenium	EPA 6020	0.00140	----	0.00100	"	"	4100198	10/05/04	10/13/04 20:51	
Silver	"	ND	----	0.00100	"	"	"	"	"	
Zinc	"	0.00675	----	0.00500	"	"	"	"	"	
<b>P4I1268-08</b>	<b>Water</b>	<b>MW-37</b>	<b>Sampled: 09/27/04 20:00</b>							
Arsenic	EPA 6020	0.0242	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 20:59	
Barium	"	0.0679	----	0.00100	"	"	"	"	"	
Cadmium	"	ND	----	0.00100	"	"	"	"	"	
Chromium	"	0.00308	----	0.00100	"	"	"	"	"	
Copper	"	0.00565	----	0.00200	"	"	"	"	"	
Lead	"	0.00334	----	0.00100	"	"	"	"	"	
Mercury	EPA 7470A	ND	----	0.000200	"	"	4100055	10/01/04	10/03/04 18:30	
Selenium	EPA 6020	ND	----	0.00100	"	"	4100198	10/05/04	10/13/04 20:59	
Silver	"	ND	----	0.00100	"	"	"	"	"	
Zinc	"	0.0181	----	0.00500	"	"	"	"	"	

North Creek Analytical - Portland

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Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Total Metals per EPA 6000/7000 Series Methods****North Creek Analytical - Portland**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1268-09</b>	<b>Water</b>	<b>MW-39</b>	<b>Sampled: 09/27/04 17:40</b>							
<b>Arsenic</b>	EPA 6020	<b>0.0304</b>	----	0.00100	mg/l	1x	4100198	10/05/04	10/13/04 21:07	
<b>Barium</b>	"	<b>0.281</b>	----	0.00100	"	"	"	"	"	
<b>Cadmium</b>	"	ND	----	0.00100	"	"	"	"	"	
<b>Chromium</b>	"	<b>0.0248</b>	----	0.00100	"	"	"	"	"	
<b>Copper</b>	"	<b>0.0832</b>	----	0.00200	"	"	"	"	"	
<b>Lead</b>	"	<b>0.0190</b>	----	0.00100	"	"	"	"	"	
<b>Mercury</b>	EPA 7470A	ND	----	0.000200	"	"	4100055	10/01/04	10/03/04 18:32	
<b>Selenium</b>	EPA 6020	<b>0.00140</b>	----	0.00100	"	"	4100198	10/05/04	10/13/04 21:07	
<b>Silver</b>	"	ND	----	0.00100	"	"	"	"	"	
<b>Zinc</b>	"	<b>0.113</b>	----	0.00500	"	"	"	"	"	
<b>P4I1268-10</b>	<b>Water</b>	<b>MW-40</b>	<b>Sampled: 09/27/04 19:00</b>							
<b>Arsenic</b>	EPA 6020	<b>0.0611</b>	----	0.00100	mg/l	1x	4100292	10/06/04	10/10/04 18:34	
<b>Barium</b>	"	<b>0.343</b>	----	0.00100	"	"	"	"	"	
<b>Cadmium</b>	"	ND	----	0.00100	"	"	"	"	"	
<b>Chromium</b>	"	<b>0.0179</b>	----	0.00100	"	"	"	"	10/11/04 16:49	
<b>Copper</b>	"	<b>0.0293</b>	----	0.00200	"	"	"	"	10/10/04 18:34	
<b>Lead</b>	"	<b>0.0308</b>	----	0.00100	"	"	"	"	"	
<b>Mercury</b>	EPA 7470A	ND	----	0.000200	"	"	4100055	10/01/04	10/03/04 18:35	
<b>Selenium</b>	EPA 6020	ND	----	0.00100	"	"	4100292	10/06/04	10/10/04 18:34	
<b>Silver</b>	"	ND	----	0.00100	"	"	"	"	"	
<b>Zinc</b>	"	<b>0.0764</b>	----	0.00500	"	"	"	"	"	

North Creek Analytical - Portland

Sarah Passarge, Project Manager

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**Environmental Laboratory Network**

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4I1268-01	Water	MW-8	Sampled: 09/27/04 17:10							
Acenaphthene	EPA 8270m	ND	----	0.100	ug/l	1x	4100099	10/04/04	10/08/04 20:20	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Fluorene	"	ND	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	0.350	"	"	"	"	"	R-03
Phenanthrene	"	ND	----	0.100	"	"	"	"	"	
Pyrene	"	ND	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 92.3%		Limits: 25 - 125 %	"				"	
Pyrene-d10		79.4%		23 - 150 %	"				"	
Benzo (a) pyrene-d12		60.9%		10 - 125 %	"				"	

North Creek Analytical - Portland

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Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

**North Creek Analytical - Portland**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P411268-02</b>	<b>Water</b>	<b>MW-8-Dup</b>	<b>Sampled: 09/27/04 17:10</b>							
Acenaphthene	EPA 8270m	ND	----	0.100	ug/l	1x	4100099	10/04/04	10/08/04 20:54	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Fluorene	"	ND	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	0.300	"	"	"	"	"	R-03
Phenanthrene	"	ND	----	0.100	"	"	"	"	"	
Pyrene	"	ND	----	0.100	"	"	"	"	"	
<i>Surrogate(s): Fluorene-d10</i>		<i>Recovery: 89.0%</i>		<i>Limits: 25 - 125 %</i>		<i>"</i>		<i>"</i>		
<i>Pyrene-d10</i>		<i>76.0%</i>		<i>23 - 150 %</i>		<i>"</i>		<i>"</i>		
<i>Benzo (a) pyrene-d12</i>		<i>60.8%</i>		<i>10 - 125 %</i>		<i>"</i>		<i>"</i>		

North Creek Analytical - Portland

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4I1268-03	Water	MW-25	Sampled: 09/27/04 16:45							
Acenaphthene	EPA 8270m	0.384	----	0.100	ug/l	1x	4100099	10/04/04	10/08/04 21:27	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Fluorene	"	ND	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	0.500	"	"	"	"	"	R-03
Phenanthrene	"	ND	----	0.100	"	"	"	"	"	
Pyrene	"	ND	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 98.0%	Limits: 25 - 125 %		"					
Pyrene-d10		80.9%	23 - 150 %		"					
Benzo (a) pyrene-d12		75.4%	10 - 125 %		"					

North Creek Analytical - Portland

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Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P411268-04</b>	Water	MW-26	Sampled: 09/27/04 16:30							R-05
Acenaphthene	EPA 8270m	2.33	----	0.200	ug/l	2x	4100099	10/04/04	10/08/04 22:01	
Acenaphthylene	"	ND	----	0.200	"	"	"	"	"	
Anthracene	"	0.277	----	0.200	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.200	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.200	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.200	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.200	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.200	"	"	"	"	"	
Chrysene	"	ND	----	0.200	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.400	"	"	"	"	"	
Fluoranthene	"	0.985	----	0.200	"	"	"	"	"	
Fluorene	"	2.07	----	0.200	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.200	"	"	"	"	"	
Naphthalene	"	ND	----	2.00	"	"	"	"	"	R-03
Phenanthrene	"	2.01	----	0.200	"	"	"	"	"	
Pyrene	"	0.664	----	0.200	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 82.4%	Limits: 25 - 125 %		"		"			
Pyrene-d10		72.0%	23 - 150 %		"		"			
Benzo (a) pyrene-d12		68.8%	10 - 125 %		"		"			

North Creek Analytical - Portland

Sarah Passarge, Project Manager

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Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1268-05</b>	<b>Water</b>	<b>MW-33</b>	<b>Sampled: 09/27/04 18:30</b>							
Acenaphthene	EPA 8270m	ND	----	0.100	ug/l	1x	4100099	10/04/04	10/08/04 22:35	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Fluorene	"	ND	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	0.100	"	"	"	"	"	
Phenanthrene	"	ND	----	0.100	"	"	"	"	"	
Pyrene	"	ND	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 102%		Limits: 25 - 125 %	"					"
Pyrene-d10		87.9%		23 - 150 %	"					"
Benzo (a) pyrene-d12		73.0%		10 - 125 %	"					"

North Creek Analytical - Portland

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Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:  
10/14/04 17:03

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P411268-06	Water	MW-34	Sampled: 09/27/04 19:30							
Acenaphthene	EPA 8270m	0.135	----	0.100	ug/l	1x	4100099	10/04/04	10/08/04 23:08	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Fluorene	"	ND	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	0.150	"	"	"	"	"	R-03
Phenanthrene	"	ND	----	0.100	"	"	"	"	"	
Pyrene	"	ND	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 97.2%	Limits: 25 - 125 %		"					"
Pyrene-d10		84.3%	23 - 150 %		"					"
Benzo (a) pyrene-d12		74.2%	10 - 125 %		"					"

North Creek Analytical - Portland

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Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P411268-07</b>	<b>Water</b>	<b>MW-36</b>	<b>Sampled: 09/27/04 18:00</b>							
Acenaphthene	EPA 8270m	0.710	----	0.100	ug/l	1x	4100099	10/04/04	10/08/04 23:42	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Fluorene	"	ND	----	0.150	"	"	"	"	"	R-03
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	1.00	"	"	"	"	"	R-03
Phenanthrene	"	ND	----	0.100	"	"	"	"	"	
Pyrene	"	ND	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 97.6%		Limits: 25 - 125 %	"				"	
Pyrene-d10		81.6%		23 - 150 %	"				"	
Benzo (a) pyrene-d12		82.4%		10 - 125 %	"				"	

North Creek Analytical - Portland

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**Project Name: Willbridge / KMEP****Project Number: PTWB-03****Project Manager: Kelly Kline****Report Created:**

10/14/04 17:03

**Polynuclear Aromatic Compounds per EPA 8270M-SIM****North Creek Analytical - Portland**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1268-08</b>	<b>Water</b>	<b>MW-37</b>	<b>Sampled: 09/27/04 20:00</b>							
Acenaphthene	EPA 8270m	ND	----	1.00	ug/l	10x	4100099	10/04/04	10/11/04 19:32	<b>R-03</b>
Acenaphthylene	"	ND	----	1.00	"	"	"	"	"	<b>R-03</b>
Anthracene	"	ND	----	0.100	"	1x	"	"	10/09/04 00:15	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
<b>Fluoranthene</b>	"	<b>0.122</b>	----	0.100	"	"	"	"	"	
Fluorene	"	ND	----	1.00	"	10x	"	"	10/11/04 19:32	<b>R-03</b>
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	1x	"	"	10/09/04 00:15	
Naphthalene	"	ND	----	1.00	"	10x	"	"	10/11/04 19:32	<b>R-03</b>
<b>Phenanthrene</b>	"	<b>0.184</b>	----	0.100	"	1x	"	"	10/09/04 00:15	
<b>Pyrene</b>	"	<b>0.251</b>	----	0.100	"	"	"	"	"	
<i>Surrogate(s): Fluorene-d10</i>		<i>Recovery: 90.0%</i>	<i>Limits: 25 - 125 %</i>		<i>10X</i>	<i>10/11/04 19:32</i>				
<i>Pyrene-d10</i>		<i>65.2%</i>	<i>23 - 150 %</i>		<i>1X</i>	<i>10/09/04 00:15</i>				
<i>Benzo (a) pyrene-d12</i>		<i>42.0%</i>	<i>10 - 125 %</i>		<i>"</i>	<i>"</i>				

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Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:  
10/14/04 17:03

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
P4I1268-09	Water	MW-39	Sampled: 09/27/04 17:40							
Acenaphthene	EPA 8270m	4.30	----	0.100	ug/l	1x	4100099	10/04/04	10/09/04 00:49	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	0.159	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	0.338	----	0.100	"	"	"	"	"	
Fluorene	"	1.23	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	1.60	"	"	"	"	"	R-03
Phenanthrene	"	1.16	----	0.100	"	"	"	"	"	
Pyrene	"	0.348	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 88.0%	Limits: 25 - 125 %		"		"			
Pyrene-d10		84.4%	23 - 150 %		"		"			
Benzo (a) pyrene-d12		74.8%	10 - 125 %		"		"			

North Creek Analytical - Portland

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Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Polynuclear Aromatic Compounds per EPA 8270M-SIM**

North Creek Analytical - Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
<b>P4I1268-10</b>	<b>Water</b>	<b>MW-40</b>	<b>Sampled: 09/27/04 19:00</b>							
Acenaphthene	EPA 8270m	ND	----	0.100	ug/l	1x	4100099	10/04/04	10/11/04 17:54	
Acenaphthylene	"	ND	----	0.100	"	"	"	"	"	
Anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) anthracene	"	ND	----	0.100	"	"	"	"	"	
Benzo (a) pyrene	"	ND	----	0.100	"	"	"	"	"	
Benzo (b) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Benzo (ghi) perylene	"	ND	----	0.100	"	"	"	"	"	
Benzo (k) fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Chrysene	"	ND	----	0.100	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	----	0.200	"	"	"	"	"	
Fluoranthene	"	ND	----	0.100	"	"	"	"	"	
Fluorene	"	ND	----	0.100	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	ND	----	0.100	"	"	"	"	"	
Naphthalene	"	ND	----	0.100	"	"	"	"	"	
Phenanthrene	"	ND	----	0.100	"	"	"	"	"	
Pyrene	"	ND	----	0.100	"	"	"	"	"	
Surrogate(s): Fluorene-d10		Recovery: 60.0%		Limits: 25 - 125 %	"					"
Pyrene-d10		82.8%		23 - 150 %	"					"
Benzo (a) pyrene-d12		54.4%		10 - 125 %	"					"

North Creek Analytical - Portland

Sarah Passarge, Project Manager

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Environmental Laboratory Network



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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**BTEX per EPA Method 8021B - Laboratory Quality Control Results**

North Creek Analytical - Portland

QC Batch: 4100193

Water Preparation Method: EPA 5030B

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	-------	----------	-------	----------	----------	-------

**Blank (4100193-BLK1)**

Extracted: 10/05/04 11:02

Benzene	EPA 8021B	ND	---	0.500	ug/l	1x	--	--	--	--	--	--	10/05/04 17:40	
Toluene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Ethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Xylenes (total)	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	

Surrogate(s): 4-BFB (PID)

Recovery: 99.8%

Limits: 70-130%

"

10/05/04 17:40

**LCS (4100193-BS1)**

Extracted: 10/05/04 11:02

Benzene	EPA 8021B	20.4	---	0.500	ug/l	1x	--	20.0	102%	(70-130)	--	--	10/05/04 18:42	
Toluene	"	21.0	---	0.500	"	"	--	"	105%	(76-129)	--	--	"	
Ethylbenzene	"	21.9	---	0.500	"	"	--	"	110%	(82-130)	--	--	"	
Xylenes (total)	"	63.9	---	1.00	"	"	--	60.0	106%	(76-130)	--	--	"	

Surrogate(s): 4-BFB (PID)

Recovery: 102%

Limits: 70-130%

"

10/05/04 18:42

**Matrix Spike (4100193-MS1)**

QC Source: P411268-01

Extracted: 10/05/04 11:02

Benzene	EPA 8021B	19.9	---	0.500	ug/l	1x	3.03	20.0	84.4%	(65-144)	--	--	10/05/04 20:33	
Toluene	"	19.6	---	0.500	"	"	0.576	"	95.1%	(68-139)	--	--	"	
Ethylbenzene	"	20.3	---	0.500	"	"	ND	"	99.8%	(69-144)	--	--	"	
Xylenes (total)	"	60.6	---	1.00	"	"	1.80	60.0	98.0%	(60-144)	--	--	"	

Surrogate(s): 4-BFB (PID)

Recovery: 108%

Limits: 70-130%

"

10/05/04 20:33

**Matrix Spike Dup (4100193-MSD1)**

QC Source: P411268-01

Extracted: 10/05/04 11:02

Benzene	EPA 8021B	20.1	---	0.500	ug/l	1x	3.03	20.0	85.4%	(65-144)	1.00% (20)		10/05/04 21:00	
Toluene	"	19.6	---	0.500	"	"	0.576	"	95.1%	(68-139)	0.00%	"	"	
Ethylbenzene	"	20.4	---	0.500	"	"	ND	"	100%	(69-144)	0.491%	"	"	
Xylenes (total)	"	61.1	---	1.00	"	"	1.80	60.0	98.8%	(60-144)	0.822%	"	"	

Surrogate(s): 4-BFB (PID)

Recovery: 109%

Limits: 70-130%

"

10/05/04 21:00

North Creek Analytical - Portland

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7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**BTEX per EPA Method 8021B - Laboratory Quality Control Results**

North Creek Analytical - Portland

QC Batch: 4100309

Water Preparation Method: EPA 5030B

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	-------	----------	-------	----------	----------	-------

**Blank (4100309-BLK1)**

Extracted: 10/06/04 18:26

Total Aromatic Hydrocarbons (TAH)EPA 8021B	ND	---	1.00	ug/l	1x	--	--	--	--	--	--	--	10/06/04 21:08	
Benzene	ND	---	0.500	"	"	--	--	--	--	--	--	--	"	
Toluene	ND	---	0.500	"	"	--	--	--	--	--	--	--	"	
Ethylbenzene	ND	---	0.500	"	"	--	--	--	--	--	--	--	"	
Xylenes (total)	ND	---	1.00	"	"	--	--	--	--	--	--	--	"	

Surrogate(s): 4-BFB (PID)

Recovery: 83.6% Limits: 70-130% "

10/06/04 21:08

**LCS (4100309-BS1)**

Extracted: 10/06/04 18:26

Benzene	EPA 8021B	18.7	---	0.500	ug/l	1x	--	20.0	93.5%	(70-130)	--	--	10/06/04 21:36	
Toluene	"	18.4	---	0.500	"	"	--	"	92.0%	(76-129)	--	--	"	
Ethylbenzene	"	18.8	---	0.500	"	"	--	"	94.0%	(82-130)	--	--	"	
Xylenes (total)	"	55.1	---	1.00	"	"	--	60.0	91.8%	(76-130)	--	--	"	

Surrogate(s): 4-BFB (PID)

Recovery: 96.8% Limits: 70-130% "

10/06/04 21:36

**Matrix Spike (4100309-MS1)**

QC Source: P411268-04RE1

Extracted: 10/06/04 18:26

Benzene	EPA 8021B	22.5	---	0.500	ug/l	1x	2.41	20.0	100%	(65-144)	--	--	10/06/04 22:34	
Toluene	"	18.4	---	0.500	"	"	1.42	"	84.9%	(68-139)	--	--	"	
Ethylbenzene	"	18.9	---	0.500	"	"	4.64	"	71.3%	(69-144)	--	--	"	
Xylenes (total)	"	46.3	---	1.00	"	"	7.57	60.0	64.6%	(60-144)	--	--	"	

Surrogate(s): 4-BFB (PID)

Recovery: 123% Limits: 70-130% "

10/06/04 22:34

**Matrix Spike Dup (4100309-MSD1)**

QC Source: P411268-04RE1

Extracted: 10/06/04 18:26

Benzene	EPA 8021B	21.8	---	0.500	ug/l	1x	2.41	20.0	97.0%	(65-144)	3.16% (20)		10/06/04 23:03	
Toluene	"	18.4	---	0.500	"	"	1.42	"	84.9%	(68-139)	0.00%	"	"	
Ethylbenzene	"	18.6	---	0.500	"	"	4.64	"	69.8%	(69-144)	1.60%	"	"	
Xylenes (total)	"	43.9	---	1.00	"	"	7.57	60.0	60.6%	(60-144)	5.32%	"	"	

Surrogate(s): 4-BFB (PID)

Recovery: 125% Limits: 70-130% "

10/06/04 23:03

North Creek Analytical - Portland

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Sarah Passarge, Project Manager

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Total Metals per EPA 6000/7000 Series Methods - Laboratory Quality Control Results****North Creek Analytical - Portland****QC Batch: 4100055 Water Preparation Method: EPA 7470A**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
<b>Blank (4100055-BLK1)</b>										Extracted: 10/01/04 15:43				
Mercury	EPA 7470A	ND	---	0.000200	mg/l	1x	--	--	--	--	--	--	10/03/04 17:46	
<b>LCS (4100055-BS1)</b>										Extracted: 10/01/04 15:43				
Mercury	EPA 7470A	0.00478	---	0.000200	mg/l	1x	--	0.00500	95.6%	(85-115)	--	--	10/03/04 17:49	
<b>LCS Dup (4100055-BSD1)</b>										Extracted: 10/01/04 15:43				
Mercury	EPA 7470A	0.00489	---	0.000200	mg/l	1x	--	0.00500	97.8%	(85-115)	2.28%	(20)	10/03/04 17:52	
<b>Duplicate (4100055-DUP1)</b>										QC Source: P4I1268-01				
Mercury	EPA 7470A	ND	---	0.000200	mg/l	1x	ND	--	--	--	NR	(20)	10/03/04 17:55	
<b>Matrix Spike (4100055-MS1)</b>										QC Source: P4I1268-01				
Mercury	EPA 7470A	0.00553	---	0.000200	mg/l	1x	ND	0.00500	111%	(75-125)	--	--	10/03/04 17:58	
<b>Matrix Spike Dup (4100055-MSD1)</b>										QC Source: P4I1268-01				
Mercury	EPA 7470A	0.00534	---	0.000200	mg/l	1x	ND	0.00500	107%	(75-125)	3.50%	(20)	10/03/04 18:02	

**QC Batch: 4100198 Water Preparation Method: EPA 200/3005**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
<b>Blank (4100198-BLK1)</b>										Extracted: 10/05/04 12:01				
Arsenic	EPA 6020	ND	---	0.00100	mg/l	1x	--	--	--	--	--	--	10/09/04 22:38	
Barium	"	ND	---	0.00100	"	"	--	--	--	--	--	--	10/12/04 05:41	
Cadmium	"	ND	---	0.00100	"	"	--	--	--	--	--	--	10/09/04 22:38	
Chromium	"	ND	---	0.00100	"	"	--	--	--	--	--	--	"	
Copper	"	ND	---	0.00200	"	"	--	--	--	--	--	--	"	
Lead	"	ND	---	0.00100	"	"	--	--	--	--	--	--	"	
Selenium	"	ND	---	0.00100	"	"	--	--	--	--	--	--	10/12/04 05:41	
Silver	"	ND	---	0.00100	"	"	--	--	--	--	--	--	10/09/04 22:38	
Zinc	"	ND	---	0.00500	"	"	--	--	--	--	--	--	"	
<b>LCS (4100198-BS1)</b>										Extracted: 10/05/04 12:01				
Arsenic	EPA 6020	0.106	---	0.00100	mg/l	1x	--	0.100	106%	(80-120)	--	--	10/09/04 22:47	
Barium	"	0.116	---	0.00100	"	"	--	"	116%	"	--	--	10/12/04 05:49	
Cadmium	"	0.107	---	0.00100	"	"	--	"	107%	"	--	--	10/09/04 22:47	
Chromium	"	0.105	---	0.00100	"	"	--	"	105%	"	--	--	"	
Copper	"	0.105	---	0.00200	"	"	--	"	105%	"	--	--	"	
Lead	"	0.101	---	0.00100	"	"	--	"	101%	"	--	--	"	
Selenium	"	0.0566	---	0.00100	"	"	--	0.0500	113%	"	--	--	10/12/04 05:49	
Silver	"	0.108	---	0.00100	"	"	--	0.100	108%	"	--	--	10/09/04 22:47	

North Creek Analytical - Portland

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Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:  
10/14/04 17:03

**Total Metals per EPA 6000/7000 Series Methods - Laboratory Quality Control Results**

North Creek Analytical - Portland

QC Batch: 4100198

Water Preparation Method: EPA 200/3005

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	-------	----------	-------	----------	----------	-------

**LCS (4100198-BS1)**

Extracted: 10/05/04 12:01

Zinc	EPA 6020	0.106	---	0.00500	mg/l	1x	--	0.100	106%	(80-120)	--	--	10/09/04 22:47	
------	----------	-------	-----	---------	------	----	----	-------	------	----------	----	----	----------------	--

**LCS Dup (4100198-BSD1)**

Extracted: 10/05/04 12:01

Arsenic	EPA 6020	0.108	---	0.00100	mg/l	1x	--	0.100	108%	(80-120)	1.87%	(20)	10/09/04 22:55	
Barium	"	0.118	---	0.00100	"	"	--	"	118%	"	1.71%	"	10/12/04 06:06	
Cadmium	"	0.108	---	0.00100	"	"	--	"	108%	"	0.930%	"	10/09/04 22:55	
Chromium	"	0.105	---	0.00100	"	"	--	"	105%	"	0.00%	"	"	
Copper	"	0.104	---	0.00200	"	"	--	"	104%	"	0.957%	"	"	
Lead	"	0.103	---	0.00100	"	"	--	"	103%	"	1.96%	"	"	
Selenium	"	0.0566	---	0.00100	"	"	--	0.0500	113%	"	0.00%	"	10/12/04 06:06	
Silver	"	0.109	---	0.00100	"	"	--	0.100	109%	"	0.922%	"	"	
Zinc	"	0.103	---	0.00500	"	"	--	"	103%	"	2.87%	"	10/09/04 22:55	

**Duplicate (4100198-DUP1)**

QC Source: P411267-01

Extracted: 10/05/04 12:01

Arsenic	EPA 6020	0.0465	---	0.00100	mg/l	1x	0.0422	--	--	--	9.70%	(20)	10/09/04 23:11	
Barium	"	0.194	---	0.00100	"	"	0.182	--	--	--	6.38%	"	10/12/04 06:22	
Cadmium	"	ND	---	0.00100	"	"	ND	--	--	--	NR	"	10/09/04 23:11	
Chromium	"	0.0108	---	0.00100	"	"	0.00829	--	--	--	26.3%	"	"	Q-05
Copper	"	0.0173	---	0.00200	"	"	0.0143	--	--	--	19.0%	"	"	
Lead	"	0.0105	---	0.00100	"	"	0.00993	--	--	--	5.58%	"	"	
Selenium	"	0.00154	---	0.00100	"	"	ND	--	--	--	NR	"	10/12/04 06:22	
Silver	"	0.0000700	---	0.00100	"	"	ND	--	--	--	NR	"	10/09/04 23:11	
Zinc	"	0.0584	---	0.00500	"	"	0.0540	--	--	--	7.83%	"	"	

**Matrix Spike (4100198-MS1)**

QC Source: P411267-02

Extracted: 10/05/04 12:01

Arsenic	EPA 6020	0.130	---	0.00100	mg/l	1x	0.0233	0.100	107%	(75-125)	--	--	10/13/04 04:10	
Barium	"	0.222	---	0.00100	"	"	0.112	"	110%	"	--	--	10/12/04 07:03	
Cadmium	"	0.103	---	0.00100	"	"	ND	"	103%	"	--	--	10/13/04 19:05	
Chromium	"	0.114	---	0.00100	"	"	0.00349	"	111%	"	--	--	10/13/04 04:10	
Copper	"	0.111	---	0.00200	"	"	0.00647	"	105%	"	--	--	10/13/04 19:05	
Lead	"	0.114	---	0.00100	"	"	0.00120	"	113%	"	--	--	10/12/04 07:03	
Selenium	"	0.0502	---	0.00100	"	"	ND	0.0500	100%	"	--	--	10/13/04 04:10	
Silver	"	0.104	---	0.00100	"	"	ND	0.100	104%	"	--	--	"	
Zinc	"	0.115	---	0.00500	"	"	0.0115	"	104%	"	--	--	10/13/04 19:05	

North Creek Analytical - Portland

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*Sarah Passarge*

Sarah Passarge, Project Manager

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**Delta Environmental Consultants - Tigard**

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Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Total Metals per EPA 6000/7000 Series Methods - Laboratory Quality Control Results**

North Creek Analytical - Portland

QC Batch: 4100198

Water Preparation Method: EPA 200/3005

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC (Limits)	% RPD (Limits)	Analyzed	Notes
<b>Matrix Spike (4100198-MS2)</b>			QC Source: P411267-03			Extracted: 10/05/04 12:01						
Arsenic	EPA 6020	0.246	---	0.00100	mg/l	1x	0.131	0.100	115% (75-125)	--	10/13/04 04:27	
Barium	"	0.191	---	0.00100	"	"	0.0784	"	113%	--	10/12/04 07:19	
Cadmium	"	0.108	---	0.00100	"	"	ND	"	108%	--	10/13/04 19:21	
Chromium	"	0.117	---	0.00100	"	"	0.00218	"	115%	--	10/13/04 04:27	
Copper	"	0.119	---	0.00200	"	"	0.00616	"	113%	--	10/13/04 19:21	
Lead	"	0.112	---	0.00100	"	"	ND	"	111%	--	10/12/04 07:19	
Selenium	"	0.0542	---	0.00100	"	"	ND	0.0500	108%	--	10/13/04 04:27	
Silver	"	0.107	---	0.00100	"	"	ND	0.100	107%	--	"	
Zinc	"	0.125	---	0.00500	"	"	0.0119	"	113%	--	10/13/04 19:21	

QC Batch: 4100292

Water Preparation Method: EPA 200/3005

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC (Limits)	% RPD (Limits)	Analyzed	Notes
<b>Blank (4100292-BLK1)</b>			Extracted: 10/06/04 15:32									
Arsenic	EPA 6020	ND	---	0.00100	mg/l	1x	--	--	--	--	10/10/04 16:48	
Barium	"	ND	---	0.00100	"	"	--	--	--	--	"	
Cadmium	"	ND	---	0.00100	"	"	--	--	--	--	"	
Chromium	"	ND	---	0.00100	"	"	--	--	--	--	10/11/04 06:37	
Copper	"	ND	---	0.00200	"	"	--	--	--	--	10/10/04 16:48	
Lead	"	ND	---	0.00100	"	"	--	--	--	--	"	
Selenium	"	ND	---	0.00100	"	"	--	--	--	--	"	
Silver	"	ND	---	0.00100	"	"	--	--	--	--	10/10/04 14:31	
Zinc	"	ND	---	0.00500	"	"	--	--	--	--	10/10/04 16:48	

**LCS (4100292-BS1)**

Extracted: 10/06/04 15:32

Arsenic	EPA 6020	0.113	---	0.00100	mg/l	1x	--	0.100	113% (80-120)	--	10/10/04 14:39	
Barium	"	0.114	---	0.00100	"	"	--	"	114%	--	"	
Cadmium	"	0.105	---	0.00100	"	"	--	"	105%	--	"	
Chromium	"	0.114	---	0.00100	"	"	--	"	114%	--	"	
Copper	"	0.114	---	0.00200	"	"	--	"	114%	--	"	
Lead	"	0.111	---	0.00100	"	"	--	"	111%	--	"	
Selenium	"	0.0543	---	0.00100	"	"	--	0.0500	109%	--	"	
Silver	"	0.107	---	0.00100	"	"	--	0.100	107%	--	"	
Zinc	"	0.111	---	0.00500	"	"	--	"	111%	--	"	

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Total Metals per EPA 6000/7000 Series Methods - Laboratory Quality Control Results**

North Creek Analytical - Portland

QC Batch: 4100292

Water Preparation Method: EPA 200/3005

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	-------	----------	-------	----------	----------	-------

**LCS Dup (4100292-BSD1)**

Extracted: 10/06/04 15:32

Arsenic	EPA 6020	0.112	---	0.00100	mg/l	1x	--	0.100	112%	(80-120)	0.889% (20)	10/10/04 14:47	
Barium	"	0.110	---	0.00100	"	"	--	"	110%	"	3.57%	"	"
Cadmium	"	0.103	---	0.00100	"	"	--	"	103%	"	1.92%	"	"
Chromium	"	0.111	---	0.00100	"	"	--	"	111%	"	2.67%	"	"
Copper	"	0.110	---	0.00200	"	"	--	"	110%	"	3.57%	"	"
Lead	"	0.109	---	0.00100	"	"	--	"	109%	"	1.82%	"	"
Selenium	"	0.0546	---	0.00100	"	"	--	0.0500	109%	"	0.551%	"	"
Silver	"	0.104	---	0.00100	"	"	--	0.100	104%	"	2.84%	"	"
Zinc	"	0.107	---	0.00500	"	"	--	"	107%	"	3.67%	"	"

**Duplicate (4100292-DUP1)**

QC Source: P411156-04

Extracted: 10/06/04 15:32

Arsenic	EPA 6020	0.00261	---	0.00100	mg/l	1x	0.00251	--	--	--	3.91% (20)	10/10/04 15:52	
Barium	"	0.0351	---	0.00100	"	"	0.0354	--	--	--	0.851%	"	"
Cadmium	"	ND	---	0.00100	"	"	ND	--	--	--	NR	"	"
Chromium	"	0.00138	---	0.00100	"	"	0.00161	--	--	--	15.4%	"	10/11/04 13:27
Copper	"	0.00263	---	0.00200	"	"	0.00246	--	--	--	6.68%	"	10/10/04 15:52
Lead	"	0.00210	---	0.00100	"	"	0.00231	--	--	--	9.52%	"	"
Selenium	"	ND	---	0.00100	"	"	ND	--	--	--	NR	"	"
Silver	"	ND	---	0.00100	"	"	ND	--	--	--	NR	"	"
Zinc	"	0.0110	---	0.00500	"	"	0.0118	--	--	--	7.02%	"	"

**Matrix Spike (4100292-MS1)**

QC Source: P411156-04

Extracted: 10/06/04 15:32

Arsenic	EPA 6020	0.115	---	0.00100	mg/l	1x	0.00251	0.100	112%	(75-125)	--	--	10/10/04 16:00
Barium	"	0.146	---	0.00100	"	"	0.0354	"	111%	"	--	--	"
Cadmium	"	0.108	---	0.00100	"	"	ND	"	108%	"	--	--	"
Chromium	"	0.115	---	0.00100	"	"	0.00161	"	113%	"	--	--	10/11/04 13:35
Copper	"	0.114	---	0.00200	"	"	0.00246	"	112%	"	--	--	10/10/04 16:00
Lead	"	0.113	---	0.00100	"	"	0.00231	"	111%	"	--	--	"
Selenium	"	0.0540	---	0.00100	"	"	ND	0.0500	108%	"	--	--	"
Silver	"	0.106	---	0.00100	"	"	ND	0.100	106%	"	--	--	"
Zinc	"	0.120	---	0.00500	"	"	0.0118	"	108%	"	--	--	"

North Creek Analytical - Portland

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Sarah Passarge, Project Manager

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Total Metals per EPA 6000/7000 Series Methods - Laboratory Quality Control Results**

North Creek Analytical - Portland

QC Batch: 4100292

Water Preparation Method: EPA 200/3005

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
<b>Matrix Spike (4100292-MS2)</b>				QC Source: P411156-05				Extracted: 10/06/04 15:32						
Arsenic	EPA 6020	0.116	---	0.00100	mg/l	1x	0.00315	0.100	113%	(75-125)	--	--	10/10/04 16:16	
Barium	"	0.142	---	0.00100	"	"	0.0355	"	106%	"	--	--	"	
Cadmium	"	0.107	---	0.00100	"	"	ND	"	107%	"	--	--	"	
Chromium	"	0.114	---	0.00100	"	"	0.00125	"	113%	"	--	--	10/11/04 14:15	
Copper	"	0.114	---	0.00200	"	"	0.00270	"	111%	"	--	--	10/10/04 16:16	
Lead	"	0.111	---	0.00100	"	"	0.00210	"	109%	"	--	--	"	
Selenium	"	0.0540	---	0.00100	"	"	ND	0.0500	106%	"	--	--	"	
Silver	"	0.107	---	0.00100	"	"	ND	0.100	107%	"	--	--	"	
Zinc	"	0.118	---	0.00500	"	"	0.0110	"	107%	"	--	--	"	

North Creek Analytical - Portland

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Sarah Passarge, Project Manager

North Creek Analytical, Inc.  
Environmental Laboratory Network



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7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Polynuclear Aromatic Compounds per EPA 8270M-SIM - Laboratory Quality Control Results**

North Creek Analytical - Portland

QC Batch: 4100099

Water Preparation Method: EPA 3520/600 Series

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC (Limits)	% RPD (Limits)	Analyzed	Notes
---------	--------	--------	------	-----	-------	-----	---------------	-----------	----------------	----------------	----------	-------

**Blank (4100099-BLK1)**

Extracted: 10/04/04 07:29

Acenaphthene	EPA 8270m	ND	---	0.100	ug/l	1x	--	--	--	--	10/08/04 14:40	
Acenaphthylene	"	ND	---	0.100	"	"	--	--	--	--	"	
Anthracene	"	ND	---	0.100	"	"	--	--	--	--	"	
Benzo (a) anthracene	"	ND	---	0.100	"	"	--	--	--	--	"	
Benzo (a) pyrene	"	ND	---	0.100	"	"	--	--	--	--	"	
Benzo (b) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	"	
Benzo (ghi) perylene	"	ND	---	0.100	"	"	--	--	--	--	"	
Benzo (k) fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	"	
Chrysene	"	ND	---	0.100	"	"	--	--	--	--	"	
Dibenzo (a,h) anthracene	"	ND	---	0.200	"	"	--	--	--	--	"	
Fluoranthene	"	ND	---	0.100	"	"	--	--	--	--	"	
Fluorene	"	ND	---	0.100	"	"	--	--	--	--	"	
Indeno (1,2,3-cd) pyrene	"	ND	---	0.100	"	"	--	--	--	--	"	
Naphthalene	"	ND	---	0.100	"	"	--	--	--	--	"	
Phenanthrene	"	ND	---	0.100	"	"	--	--	--	--	"	
Pyrene	"	ND	---	0.100	"	"	--	--	--	--	"	

Surrogate(s): Fluorene-d10

Recovery:

93.6%

Limits: 25-125%

"

10/08/04 14:40

Pyrene-d10

84.0%

23-150%

"

"

Benzo (a) pyrene-d12

81.6%

10-125%

"

"

**LCS (4100099-BS1)**

Extracted: 10/04/04 07:29

Acenaphthene	EPA 8270m	1.96	---	0.100	ug/l	1x	--	2.50	78.4% (26-135)	--	10/08/04 12:02	
Benzo (a) pyrene	"	2.04	---	0.100	"	"	--	"	81.6% (38-137)	--	"	
Pyrene	"	2.04	---	0.100	"	"	--	"	81.6% (33-133)	--	"	

Surrogate(s): Fluorene-d10

Recovery:

89.2%

Limits: 25-125%

"

10/08/04 12:02

Pyrene-d10

80.4%

23-150%

"

"

Benzo (a) pyrene-d12

82.0%

10-125%

"

"

**LCS Dup (4100099-BSD1)**

Extracted: 10/04/04 07:29

Acenaphthene	EPA 8270m	1.79	---	0.100	ug/l	1x	--	2.50	71.6% (26-135)	9.07% (60)	10/08/04 12:36	
Benzo (a) pyrene	"	2.19	---	0.100	"	"	--	"	87.6% (38-137)	7.09%	"	
Pyrene	"	2.13	---	0.100	"	"	--	"	85.2% (33-133)	4.32%	"	

Surrogate(s): Fluorene-d10

Recovery:

82.8%

Limits: 25-125%

"

10/08/04 12:36

Pyrene-d10

81.6%

23-150%

"

"

Benzo (a) pyrene-d12

85.2%

10-125%

"

"

North Creek Analytical - Portland

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**Delta Environmental Consultants - Tigard**

7150 SW Hampton - Suite 220  
Tigard, OR 97223

Project Name: **Willbridge / KMEP**

Project Number: PTWB-03

Project Manager: Kelly Kline

Report Created:

10/14/04 17:03

**Notes and Definitions**

**Report Specific Notes:**

- Q-05 - Analyses are not controlled on RPD values from sample concentrations less than 10 times the reporting limit.
- R-03 - The reporting limit for this analyte was raised due to matrix interference.
- R-05 - Reporting limits raised due to dilution necessary for analysis. Sample contains high levels of reported analyte, non-target analyte, and/or matrix interference.

**Laboratory Reporting Conventions:**

- DET - Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
- ND - Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
- NR / NA - Not Reported / Not Available
- dry - Sample results reported on a dry weight basis. Reporting Limits are corrected for %Solids when %Solids are <50%.
- wet - Sample results and reporting limits reported on a wet weight basis (as received).
- RPD - Relative Percent Difference. (RPDs calculated using Results, not Percent Recoveries).
- MRL - METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
- MDL\* - METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B.  
\*MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated results.
- Dil - Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
- Reporting limits - Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.

North Creek Analytical - Portland

Sarah Passarge, Project Manager

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**North Creek Analytical, Inc.  
Environmental Laboratory Network**

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541-383-9310 FAX 382-7588  
907-334-9200 FAX 334-9210

## CHAIN OF CUSTODY REPORT

Work Order #: P4I1268

CLIENT: <u>Delta Environmental</u>		INVOICE TO: <u>Steve Osburne</u>		<b>TURNAROUND REQUEST</b> in Business Days * Organic & Inorganic Analyses <input checked="" type="checkbox"/> 10 <input type="checkbox"/> 7 <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> <1 STD. Petroleum Hydrocarbon Analyses <input type="checkbox"/> 5 <input type="checkbox"/> 4 <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 <input type="checkbox"/> <1 STD. <b>OTHER</b> Specify: _____ * Turnaround Requests less than standard may incur Rush Charges.					
REPORT TO: <u>Kelly Kline</u>		KINDERMORGAN							
ADDRESS: <u>7150 SW Hampton #220</u>		P.O. NUMBER:							
PHONE: <u>639-8095</u> FAX: <u>639-7619</u>									
PROJECT NAME: <u>KinderMorgan willbridge</u>		PRESERVATIVE							
PROJECT NUMBER: <u>PTWB-03</u>		REQUESTED ANALYSES							
SAMPLED BY: <u>NW1/JMN</u>									
CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	BTEX	PAHs	1,2,3,4,5,6	7,8,9,10	MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	NCA WO ID
1 MW-8	09-27-04 17 <sup>10</sup>	X	X	X		W	5		
2 MW-8-Dug	17 <sup>10</sup>	X	X	X					
3 MW-25	16 <sup>45</sup>	X	X	X					
4 MW-26	16 <sup>30</sup>	X	X	X					
5 MW-33	18 <sup>30</sup>	X	X	X					
6 MW-34	19 <sup>30</sup>	X	X	X					
7 MW-36	18 <sup>00</sup>	X	X	X					
8 MW-37	20:00	X	X	X					
9 MW-39	17 <sup>40</sup>	X	X	X					
10 MW-40	19 <sup>00</sup>	X	X	X					
RELEASED BY: <u>Nathan Hemphill</u>		DATE: _____		RECEIVED BY: <u>Bob F</u>		DATE: <u>9/29/04</u>			
PRINT NAME: <u>Nathan Hemphill</u>		FIRM: <u>Delta</u>		PRINT NAME: <u>Bob F</u>		FIRM: <u>NCA</u>		TIME: <u>11:05</u>	
RELEASED BY: <u>Bob F</u>		DATE: <u>9/29/04</u>		RECEIVED BY: <u>VANDERBILT</u>		DATE: <u>9-29-04</u>			
PRINT NAME: <u>Bob F</u>		FIRM: <u>NCA</u>		PRINT NAME: <u>VANDERBILT</u>		FIRM: <u>NCA</u>		TIME: <u>11:25</u>	
ADDITIONAL REMARKS:									
COC REV 1/03						TEMP: <u>11.5</u>		PAGE <u>1</u> OF <u>1</u>	

TEMP:

11.5

22.1

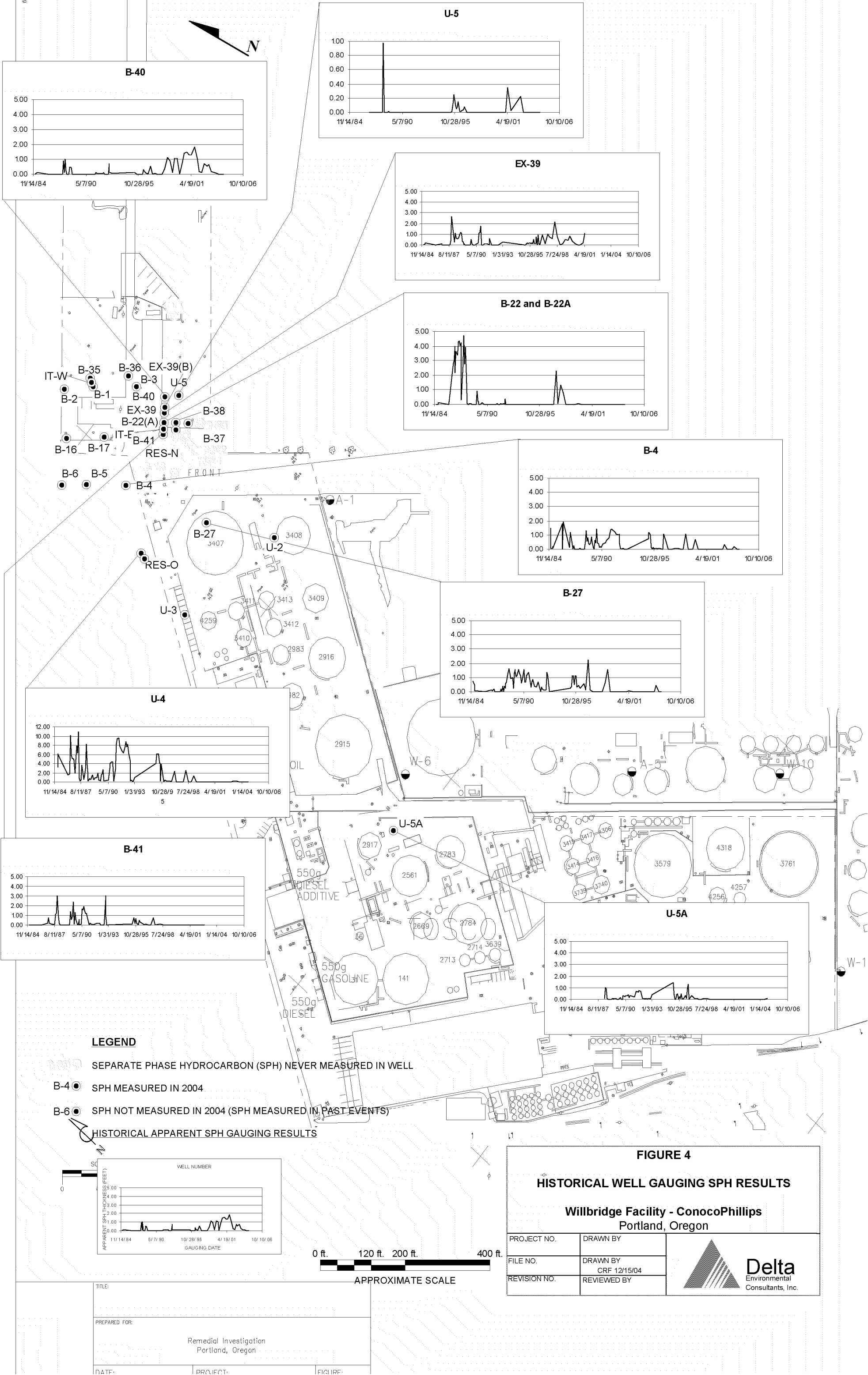
11.8

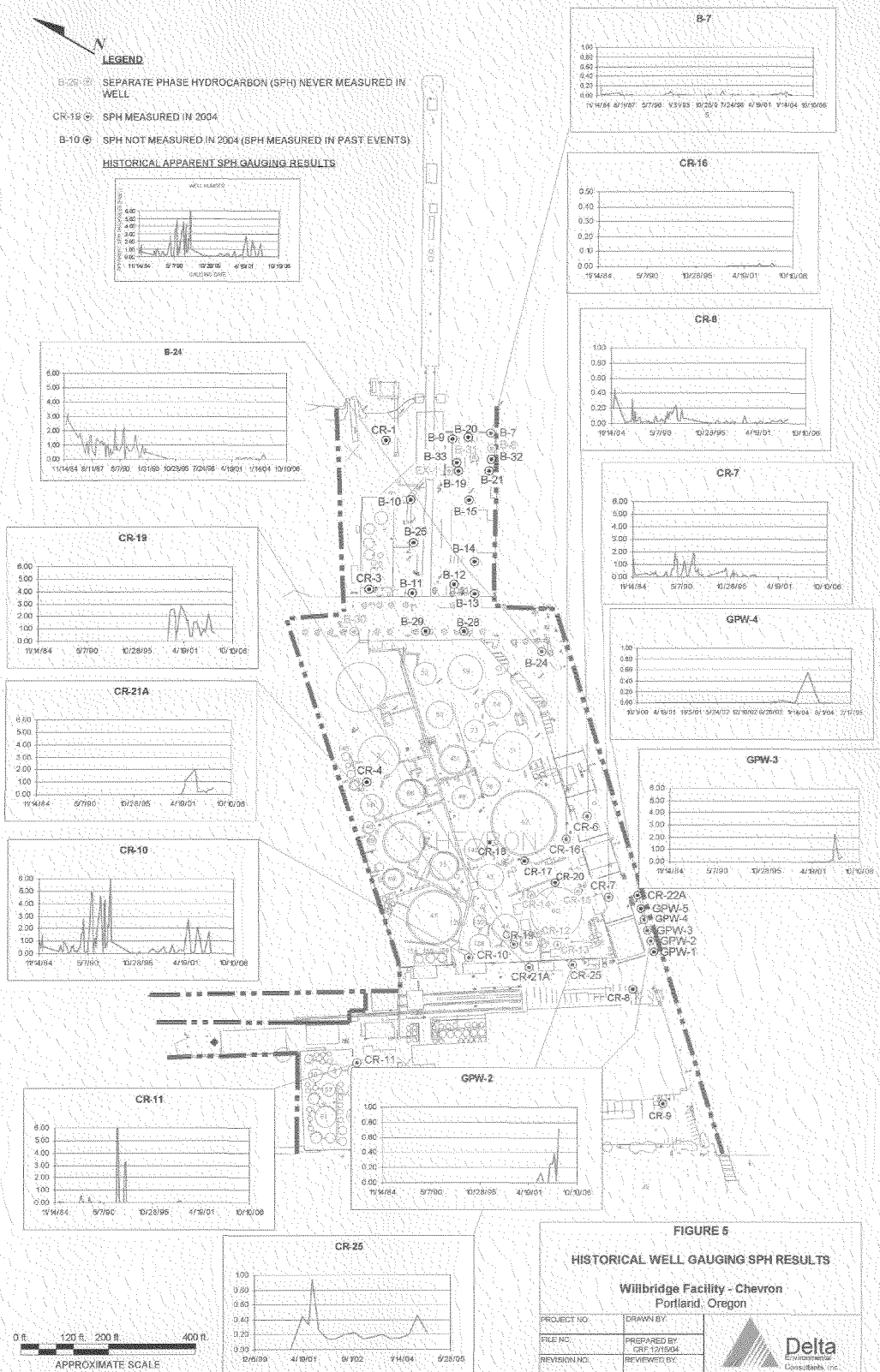
PAGE

OF

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# LEGEND

- MW-1 SEPARATE PHASE HYDROCARBON (SPH) NEVER MEASURED IN WELL
- MW-19 SPH MEASURED IN 2004
- MW-9 SPH NOT MEASURED IN 2004 (SPH MEASURED IN PAST EVENTS)

## HISTORICAL APPARENT SPH GAUGING RESULTS

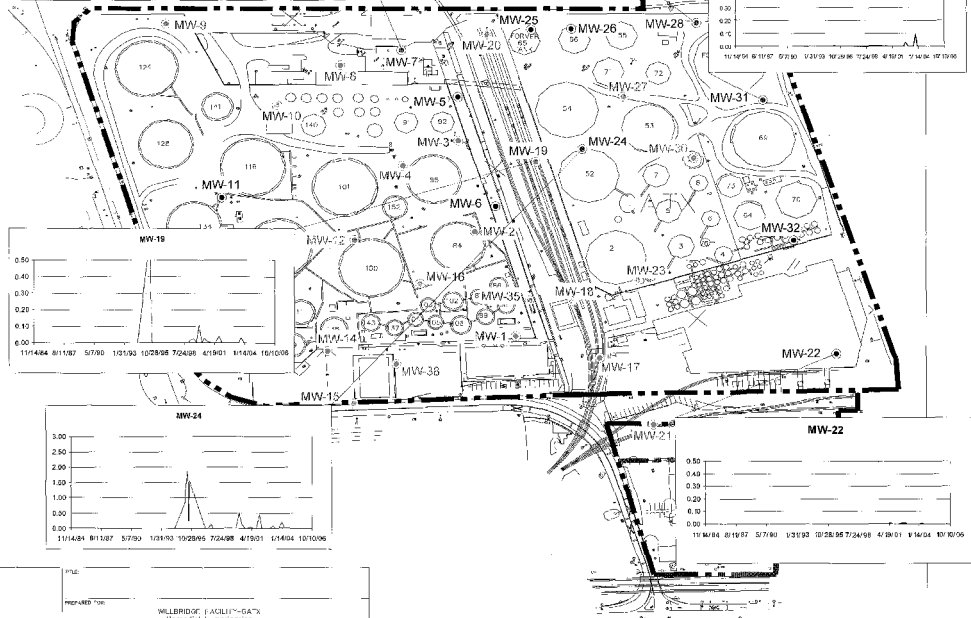
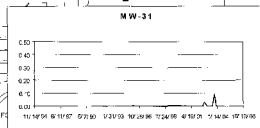
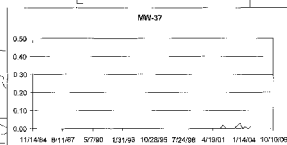
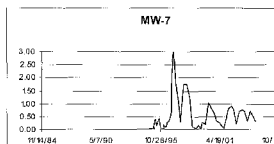
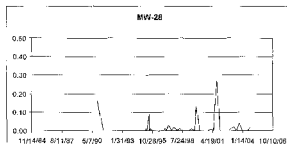
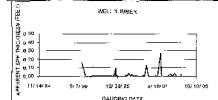


FIGURE 6

## HISTORICAL WELL GAUGING SPH RESULTS

Willbridge Facility - Kinder Morgan  
Portland, Oregon

PROJECT NO.	DRAWN BY
FILE NO.	DRAWN BY
REVISION NO.	REVIEWED BY



0 ft 120 ft 200 ft 400 ft  
APPROXIMATE SCALE



## PROPOSAL FOR SOURCE CONTROL MEASURE

Chevron Willbridge Distribution Center

5531 NW Doane Avenue

Portland, Oregon

And

Conoco Phillips Terminal

5528 NW Doane Avenue

Portland, Oregon

DEQ WMCSR-NWR-94-06

August 13, 2004

Prepared for:

**ChevronTexaco**

6001 Bollinger Canyon Road K2240

San Ramon, CA 94583

Prepared by:



*An Employee-Owned Company*

Science Applications International Corporation

1220 SW Morrison Avenue, Suite 500

Portland, Oregon 97205

Contract No. 99014508

SAIC Project 06-6102-00-3980-285

# PROPOSAL FOR SOURCE CONTROL MEASURE

Chevron Willbridge Distribution Center  
5531 NW Doane Avenue  
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DEQ WMCSR-NWR-94-06

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Prepared by:



Science Applications International Corporation  
1220 SW Morrison Avenue, Suite 500  
Portland, Oregon 97205

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Senior Geologist

SAIC Project 06-6102-00-3980-285  
DCN: C03-SAI-1001868-01-05715

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## **1.0 INTRODUCTION**

Science Applications International Corporation (SAIC) is submitting this proposal to the Oregon Department of Environmental Quality (DEQ) for the installation of a sheet pile wall as a source control measure at the Chevron (Chevron) Willbridge Distribution Center and the Conoco Phillips Terminal in Portland, Oregon (Figure 1). Chevron and Conoco Phillips are requesting DEQ approval to install the wall as a source control measure under DEQ Consent Order WMCSR-NWR-94-06.

The purpose of the wall is to mitigate potential migration pathways for groundwater seeps to the Willamette River. The potential migration pathways include the alignment of an abandoned sewer and the former Holbrook Slough. The location of the proposed wall is at river mile 7.8 along the west bank of the Willamette River between the Chevron and Conoco Phillips docks. The property is owned by the Port of Portland and the Oregon Division of State Lands, and is leased to Chevron and Conoco Phillips.

### **1.1 Background**

Portions of the Chevron and Conoco Phillips terminals overlie the historic Holbrook Slough and Kittridge Lake. A silt ridge (natural levee) separated Kittridge Lake from the Willamette River. As the Holbrook Slough formed, it cut through the silt ridge, connecting Kittridge Lake to the Willamette River. With development of the terminals, the Holbrook Slough and Kittridge Lake were filled with dredge sand. During this period of development, a sewer pipe was constructed parallel to NW Doane Avenue with an outfall at the mouth of the Holbrook Slough. In 1927, the sewer was replaced with a 27-inch diameter wood stave sewer (27-inch sewer).

Separate phase hydrocarbons (SPH) have been observed being conveyed through the 27-inch sewer, and seeping from the area around the outfall. In an effort to mitigate these migration pathways, a weir was constructed at the outfall to collect SPH being conveyed through the 27-inch sewer, and absorbent booms were placed in the Willamette River around the area where SPH was observed to be seeping. In 1982, the City of Portland Bureau of Environmental Services (BES) replaced the 27-inch sewer with a 60-inch diameter concrete storm water pipeline located south of the Conoco Phillips dock (Figure 2). The BES reportedly abandoned the 27-inch sewer and outfall by filling them with concrete. After the 27-inch sewer and outfall had been abandoned, SPH was periodically observed seeping from the area around the outfall.

In 1988, at the direction of DEQ, the Holbrook Trench recovery system was installed to intercept and prevent seepage of SPH into the Willamette River (Figure 3). The Holbrook Trench recovery system is comprised of a barrier wall with a synthetic liner, two trenches, and a recovery sump. At installation, the system recovered SPH and effectively minimized seepage into the river. The system was operated continuously until 1992, and intermittently until 1997. By 1997, SPH seepage was only observed during periodic events that occurred with specific flow conditions in the Willamette River. The system was not operated between 1997 and 2001. Since 2001, the system has been used during periods of low river flow.

Based on the results of prior site investigations and remedial efforts, SPH appears to be migrating through the dredge sand fill in the historic channel of the Holbrook Slough, periodically seeping into the Willamette River from the area of the 27-inch sewer outfall.

## **2.0 INTERIM INVESTIGATION AND REMEDIAL MEASURES**

Since 1997, SPH has been observed to seep from the area around the 27-inch sewer outfall during stages of low river flow, and when the river flow decreases from high stages at an approximate elevation of 16 feet to an approximate elevation of 11 feet. Globules of SPH are observed in the river beyond the existing trench system during low flow stages. When the river flow decreases from high to low flow conditions, SPH is observed seeping from the toe of the Chevron rip rap slope. Based on these observations, the SPH migration appears to be affected with specific changes in river flow levels.

### 2001

In the summer of 2001, the Holbrook Trench recovery system was re-started to conduct a groundwater pumping test. The recovery sump was operated at a pump removal rate of three gallons per minute to assess groundwater drawdown in and around the Holbrook Trench recovery system. As the river stages increased during the winter months, the river flow rose over the top of the barrier wall of the Holbrook Trench recovery system at an elevation of approximately 11 feet. At this point, the recovery system was inundated with river water and the system was shut down. Based on observations from operating the recovery system and the river flow conditions exhibiting SPH seepage, a new barrier wall and recovery system were proposed to replace the Holbrook Trench recovery system to eliminate SPH seepage and improve the future remedial efforts.

### 2002

The Holbrook Trench recovery system was operated in the summer of 2002 after river levels fell below an elevation of 11 feet. Several phases of sub-surface exploration were completed to assess the feasibility of the proposed wall system, and to begin the design process. Delta Consultants provided the environmental services during this time period. A summary of exploratory boring and test pit logs are provided in Appendix A.

On May 8, 2002, 19 exploratory geoprobe borings were drilled in an effort to define the contact of the dredge sand fill material and native silt in the Holbrook Slough, and to identify the alignment of the abandoned 27-inch sewer pipeline (Figure 4). The results of this exploration provided a baseline delineation of the fill material within the slough, including mapping a depression in the silt ridge south of the inferred location of the 27-inch sewer outfall. The location of the 27-inch sewer pipeline was not identified during this phase of exploration. Due to limiting factors associated with geoprobe sampling methodology, sample recovery was observed to be poor and the exact elevation of the dredge sand/silt contact was not determined.

On June 24, 2002, 13 exploratory test pits were excavated parallel to the river between an elevation of 18 and 22 feet, and near the inferred confluence of the 27-inch sewer outfall and Holbrook Slough, to supplement the findings of the geoprobe exploration and to continue efforts to identify the alignment of the 27-inch sewer (Figure 5). The test pits allowed for better observations of sub-surface conditions for the identification of the contact of the dredge sand and silt, and characterization of petroleum hydrocarbon impacts in the area of the former Holbrook Slough at the boundary between the Chevron and Conoco Phillips properties. Groundwater was observed to seep from the dredge sand fill in the test pits at a slow rate (less than 1 gallon per minute), with an increase in flow to moderate rates (1 to 3 gallons per minute) at lower elevations where it is influenced by the river. SPH was only encountered in the dredge sand fill extending from the base of the rip rap slope, and measurable thicknesses of SPH were only encountered in test pits

completed at the base of the slope. The native silt was not observed to be impacted by petroleum hydrocarbons and was observed to be moist. These observations indicated that groundwater encountered in the dredge sand fill is perched above the native silt, and that SPH is confined to the channel of the historic Holbrook Slough. The alignment of the abandoned 27-inch sewer pipeline was not identified during this phase of exploration; however, pieces of vitreous clay pipe were encountered and were suspected to be remnants of the sewer line replaced by the 27-inch sewer.

Six soil samples were collected from the dredge sand at the contact with the native silt for laboratory analyses of gasoline range petroleum hydrocarbons by North West Method NWTPH-Gx, and diesel range petroleum hydrocarbons by North West Method NWTPH-Dx, and volatile organic compounds (VOC's) by Environmental Protection Agency (EPA) Method 8260B. The analytical results are summarized in Tables 1 through 5. The analytical results showed detection diesel range petroleum hydrocarbons and VOC's in soil samples T-1, T-6, T-7 and T-8. Based on the results for soil samples T-1 and T-8, follow-up analyses were performed for polynuclear aromatic hydrocarbons (PAH's) by EPA Method 8270C SIM, heavy metals by EPA 6000/7000 series Methods, and polychlorinated biphenyls (PCB's) by EPA Method 8082.

The results of laboratory analysis showed the presence of diesel range petroleum hydrocarbons and associated fractions of VOC's and PAH's in T-1, T-6, T-7 and T-8. Low concentrations of gasoline range petroleum hydrocarbons were detected in T-6 and T-7, however, based on the setting where the impacts are present, these detections may be anomalous as a result of fractionation or degradation of the diesel range petroleum hydrocarbons. The follow-up analyses for heavy metals and PCBs showed no detection at or above the respective method detection limits. The analytical results for T-8 showed a detection of diesel range petroleum hydrocarbons at 20,600 milligrams per kilogram (mg/kg). It was later observed that test pit 8 (where T-8 was collected) was excavated in the backfill of the Holbrook Trench recovery system. Because T-8 was collected from a trench backfill designed to intercept and impound SPH along an extended area, the analytical results probably do not accurately represent subsurface conditions and should not be utilized to assess SPH migration. The analytical results suggest that SPH is migrating through the dredge sand fill along the inferred alignment of the 27-inch sewer.

In June 2002, 3 monitoring wells were installed in the beach area of the Conoco Phillips property (Figure 6). Well U-10 (4-inch diameter, 25 foot depth) was installed as a pump test well to determine potential infiltration for a recovery system, and wells U-11 and U-12 were installed to determine vertical groundwater flow. No SPH was observed in these wells. A pump test was initiated in U-10; however, after a short period the well was pumped dry.

In August 2002, 5 additional exploratory test pits were excavated parallel to the river at an approximate surface elevation of 15 feet to assess subsurface conditions along the alignment of the proposed wall at the base of the rip rap slope (Figure 5). Petroleum hydrocarbon affected soil and perched groundwater were observed in the dredge sand fill material of the Holbrook Slough along the contact with the native silt, near the base of the Chevron rip rap slope on Conoco Phillips property. To test the feasibility of using a pneumatic belt skimmer to remove SPH, approximately 47 tons of impacted soil was excavated from the area of the former 27-inch sewer outfall (Figure 6). The excavation was backfilled with washed, 1- to 2-inch diameter, rounded drain rock to form a sump. Two temporary 12-inch diameter recovery sumps were installed in the drain rock to intercept SPH infiltration. SPH did not accumulate in the sumps, and the use of removal actions with a belt skimmer were considered unfeasible. Based on these investigations, a sheet pile wall with a top elevation of 16 feet was selected as the remedial option.

### 2003 to Present

In February 2003, Chevron assigned this project to SAIC. During the spring runoff in April 2003, the river flow stages rose above the top of the Holbrook Trench recovery system. A sheen was observed contained in the boom area in the Willamette River. Stain on the rip rap slope indicated that SPH was seeping at a higher elevation than the top elevation of the proposed sheet pile wall. The proposed design was re-evaluated, and the top elevation of the wall was modified to 20 feet.

The Holbrook Trench recovery system re-started in the summer of 2003 and was operated until December 2003 as a continued effort to mitigate SPH seepage. Since December 2003, SAIC has been performing weekly groundwater monitoring, maintenance of the passive recovery system, and maintaining the absorbent booms in the Willamette River. In February 2004, SAIC installed absorbent socks in the recovery sumps to remove SPH, and has been monitoring this system during the weekly site visits. During these site visits, the absorbent socks are removed from the sumps and are wringed out to recover any SPH that may have accumulated. Typically, about one gallon of SPH and water is recovered from the socks, which is subsequently transferred into a treatment system at the Chevron facility.

Groundwater samples have been collected from select monitoring wells for analysis of benzene, toluene, ethyl-benzene and total xylene (BTEX) by EPA Method 8021, PAH's by EPA Method 8270C SIM and total metals by EPA 6000/7000 Series Methods. A summary of the analytical results are presented in tables 6 through 9. A review of the analytical data and well measurements show that small amounts of SPH have been measured in B-7, and low concentrations of BTEX and PAH's have been detected in B-7, P-2, U-10, U-11 and U-12. Total metals have been detected in all of the wells in the monitoring network, and appear to be at concentrations with normal background levels.

In July 2004, the Holbrook Trench recovery system was re-started, and is operating at an approximate removal rate of 4 gallons per minute.

## **3.0 PROPOSED PROJECT**

The sheet pile wall has been proposed as a remedial measure to eliminate seepage of SPH from the area of the 27-inch sewer outfall and the Holbrook Slough into the Willamette River, enhance recovery of SPH, and to control the flow of dissolved-phase petroleum hydrocarbons in groundwater to the river. Chevron and Conoco Phillips propose to replace the existing recovery system with a new sheet pile wall and SPH recovery system that has been designed to encompass the mouth of the historic Holbrook Slough and for continuous operation that will not be affected by river flow stages.

### **3.1 New Wall Design**

The sheet pile wall was engineered and designed by RSV Engineering Incorporated. The concept of this design is to eliminate SPH migration through the dredge sand fill in the Holbrook Slough by driving the steel sheet piles through the fill and embedding the bottom into the underlying silt ridge. A copy of the design plans are provided in Attachment A, and the design details are discussed below.

The design of the proposed sheet pile wall is presented on 10 sheets in the attached plan set. Sheets 1 and 2 contain general information about the project location and construction details. Additional

Project Notes on Sheet 2 specify acceptable construction materials that may be used, including sheet pile make and model, use of watertight seals, and the gradation of sand backfill in the collection trenches. Sheet 3 illustrates the area of the project Site, showing the location of the Willamette River, surrounding terminals and docks, 60-inch storm sewer, and the approximate location of the 27-inch sewer. Sheet 4 shows the existing site features including the property boundaries, the ordinary high water mark at an elevation of 16 feet, the chevron rip rap slope, and the location of the existing Holbrook Trench recovery system.

Sheets 5 and 6 show the alignment and cross section of the proposed sheet pile wall. The wall would consist of two sections, with one section extending between Bends A and C (northern section), and the other section extending between Bends D and E (southern section). The northern section would be constructed of 25 foot long sheet piles along a 160 foot long alignment. The sheets would be driven from an approximate surface elevation between 14 and 20 feet, through the dredge sand fill, and would be embedded in approximately 15 feet of native silt with a bottom elevation of -5 feet. The top of this section of the wall would be at an elevation of 20 feet, with the sheet piles extending approximately 7 feet above ground surface between Bends A and B, and would gradually match the existing grade between Bends B and C. The southern wall section would be constructed of 20 foot long sheet piles in a 105 foot long alignment. The top of the sheets would be driven to the ground surface at an elevation of 16 feet, through the dredge sand fill and embedded in the native silt that would be encountered at an elevation between 11 and 4, and would have a bottom elevation of -4 feet.

Sheets 7 and 8 show the collection trench details for both sections of the wall, including vaults and sumps, drainage pipes, fill details, and groundwater release conduits. A trench will be excavated on the up gradient side of both wall sections to intercept SPH and impacted groundwater migrating through the dredge sand fill towards the Willamette River. The trenches will be sloped towards a collection sump that will have two 12-inch diameter PVC extraction sumps that will be completed at finished ground surface with 24-inch concrete vaults. A 4-inch diameter perforated pipe will be placed in the bottom of the trench to enhance drainage towards the extraction sumps, and the trenches will be backfilled with sand to two feet below ground surface. Three 4-inch diameter PVC maintenance sumps will be attached to the perforated drainage pipe at various distances from the extraction sumps that will be completed at finished ground surface with 12-inch concrete vaults. Groundwater release conduits will be installed in the collection sumps to provide a drainage pathway that may be opened at some time in the future for post-remediation monitoring. The top of the trenches will be capped with multi-dimensional rip rap to match the surrounding surface. A non-woven geotextile fabric will be placed around the sand fill to prevent sediment flow that may decrease its desired drainage properties. As shown on Sheet 7, the length of the trench in the northern wall section will be 160 feet long, with the bottom of the collection trench at an elevation of 10 feet, and the bottom of the collection sump at an elevation of 3 feet. Because the sheet pile wall will extend up to 7 feet above existing ground surface, the down slope side of the wall will be covered with multi-dimensional rip rap to match the existing surface. Sheet 8 shows the length of the collection trench behind the south wall section to be 105 feet long, with the bottom elevation of the trench at 6 feet and the bottom elevation of the collection sump at 3 feet. Recovery systems would be installed in the extraction sumps remove any SPH or impacted groundwater that collects in the trenches. The recovery systems would be connected to a redundant network of effluent pipelines, that will allow the capability for groundwater treatment at compounds located at either the Chevron terminal or Conoco Phillips terminal.



Sheet 9 illustrates the final grading around the northern wall section. Fill will be placed to match the top elevation of the wall 20 feet, and will cover the existing Chevron rip rap slope to complete it as a flat area. The down slope side of the protruding sheet pile wall will be covered with multi-dimensional rip rap, with the base of this fill section founding on the slope between the base of the wall and the 13 foot elevation contour (Figure 9). Sheet 10 specifies erosion control materials and methods that will be utilized for this project. A silt fence will be properly notched into the ground surface, and will encompass the down slope area of the project site. The base of the silt fence will be at an approximate elevation of 13 feet. The silt fence will wrap around the north side of the project area and to connect with the base of the Chevron rip rap slope, and will wrap around the southern portion of the project area below the Conoco Phillips dock and will extend up-slope to an approximate elevation of 25 feet.

#### **4.0 SCHEDULE**

Chevron and Conoco Phillips would like to begin work on this project as soon as possible, in order to have it installed by October 2004.

#### **5.0 CONCLUSION**

Chevron and Conoco Phillips are requesting DEQ approval to install a sheet pile wall as a source control measure under DEQ Consent Order WMCSR-NWR-94-06. The installation of this wall will replace the existing Holbrook Trench recovery system and eliminate seepage of SPH from the area of the 27-inch sewer outfall and the Holbrook Slough into the Willamette River, enhance recovery of SPH, and to control the flow of dissolved-phase petroleum hydrocarbons in groundwater to the river. During high river flow events, SPH and dissolved phase petroleum hydrocarbons could migrate into the Willamette River. The proposed sheet pile wall will meet the DEQ requirements for upland source control of contaminants to the Willamette River. In addition, the mitigation of the SPH seeps will help protect, conserve, enhance, and maintain the natural, scenic, historical, economic, and recreational qualities of lands along Portland's rivers and it provides for a more aesthetically pleasing environment along the Willamette River.

#### **6.0 LIMITATIONS**

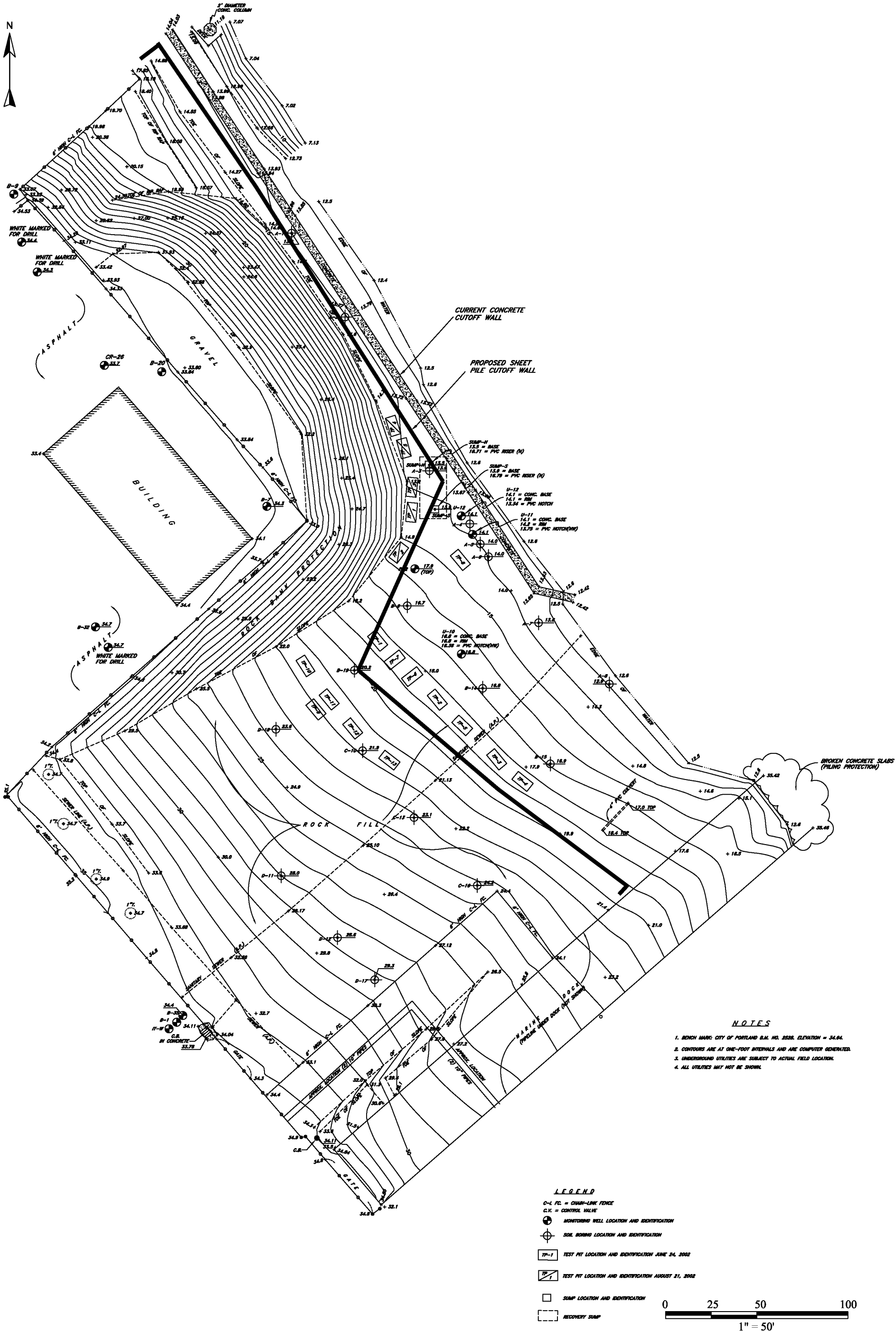
This proposal has been prepared by Science Applications International Corporation (SAIC) for the sole and exclusive use of Chevron. This proposal is not intended for use or reliance by any other party. Any other person or entity obtaining, using, or relying on this proposal hereby acknowledges that they do so at their own risk, and that SAIC shall have no responsibility or liability for the consequences thereof. This proposal is intended to be used in its entirety. Taking or using in any way excerpts from this proposal is not permitted. Excerpts, which are taken out of context, run the risk of being misinterpreted and are, therefore, not representative of the findings of this assessment.


In preparing this proposal, SAIC has relied on verbal and written information provided by secondary sources and interviews. Because the assessment consisted of evaluating a limited supply of information, SAIC may not have identified all potential items of concern and/or discrepancies. SAIC has made no independent investigations concerning the accuracy or completeness of the information relied upon. SAIC cannot and does not guarantee the authenticity or reliability of the information on which conclusions and judgments in this proposal are based. In addition, conclusions and judgments may be formed based on conditions at the time of the assessment not being representative of the manner in which business is conducted, past business practices, and/or

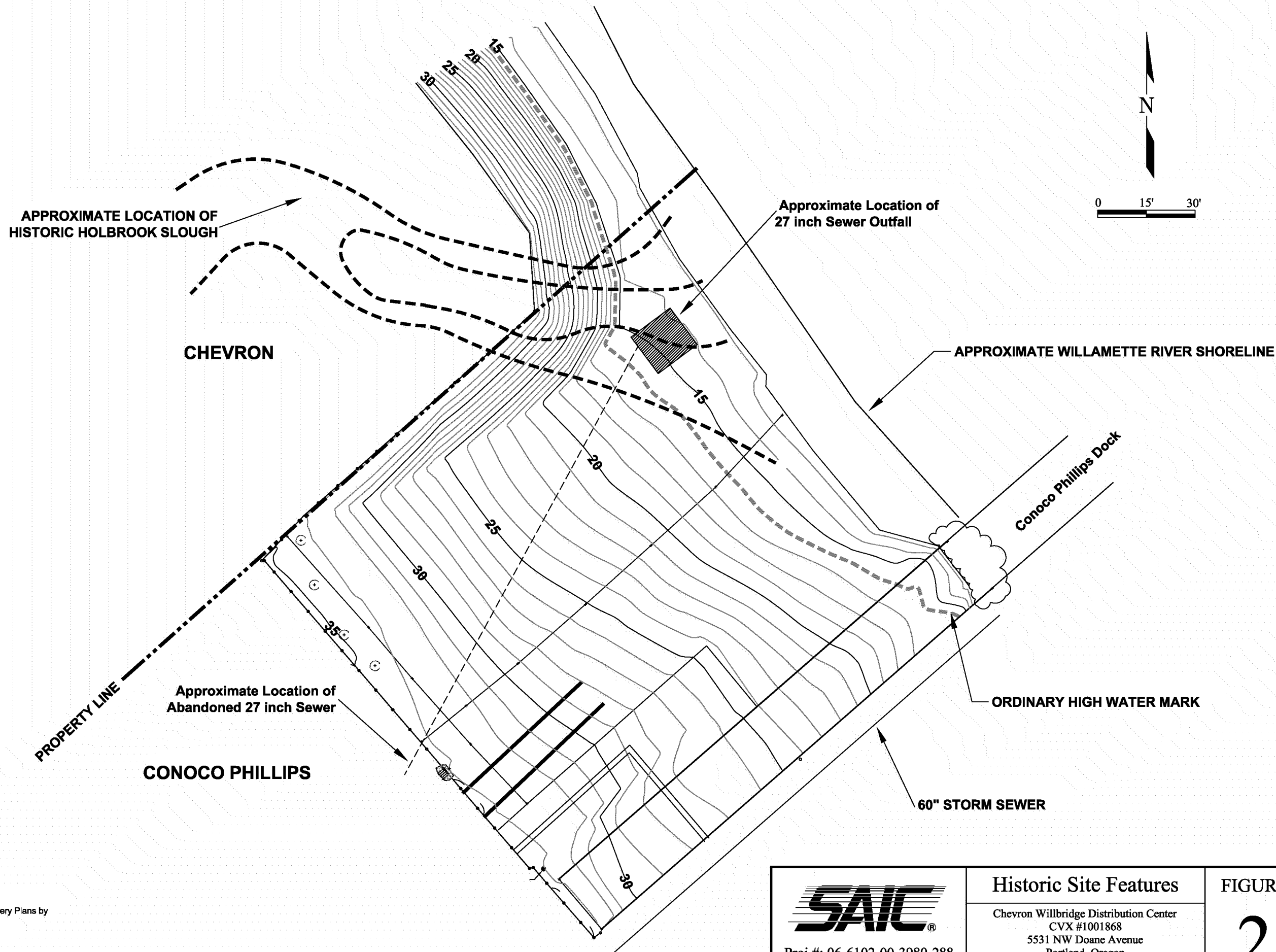
changing conditions since the time of the on-site part of the assessment. To the extent that SAIC has, in whole or in part, based any conclusions or judgments in this proposal on such information, the conclusions and judgments are contingent on the validity of the information provided. A full and complete determination as to whether or not the subject property is free from environmental contamination cannot be made under the scope of this investigation, SAIC is not making such a determination, either expressed or implied, in this proposal and any such reliance by Chevron is at Chevron's own risk.

SAIC warrants only that project activities under this contract have been performed, within the parameters communicated by Chevron, with that degree of skill and judgment normally exercised by recognized professional firms performing services of a similar nature and that SAIC has documented findings in an objective and technically defensible manner. SAIC specifically disclaims and client waives any expressed or implied standards, guarantees, or warranties, including but not limited to warranties of merchantability or fitness for a particular purpose, custom or usage, or otherwise as to any goods or services that are the subject of this contract.

## FIGURES



 Proj #: 06-6102-00-3980-285 8.5X11_LANDSCAPE.dwg	GROUNDWATER ELEVATION CONTOURS AND BENZENE CONCENTRATIONS	FIGURE  1
	Chevron Gas Station 9-2736 7725 Sunset Highway Mercer Island, Washington	
	Date: _____ Drawn By: _____	



NOTES

- 1) Location of Holbrook Slough Inferred from 5/88 Trench Recovery Plans by Riedel Environmental
- 2) Base Map Provided by RSV Engineering Wilsonville, Oregon



Proj #: 06-6102-00-3980-288

100-1868HolbrookBaseMap(fig2).dwg

Historic Site Features

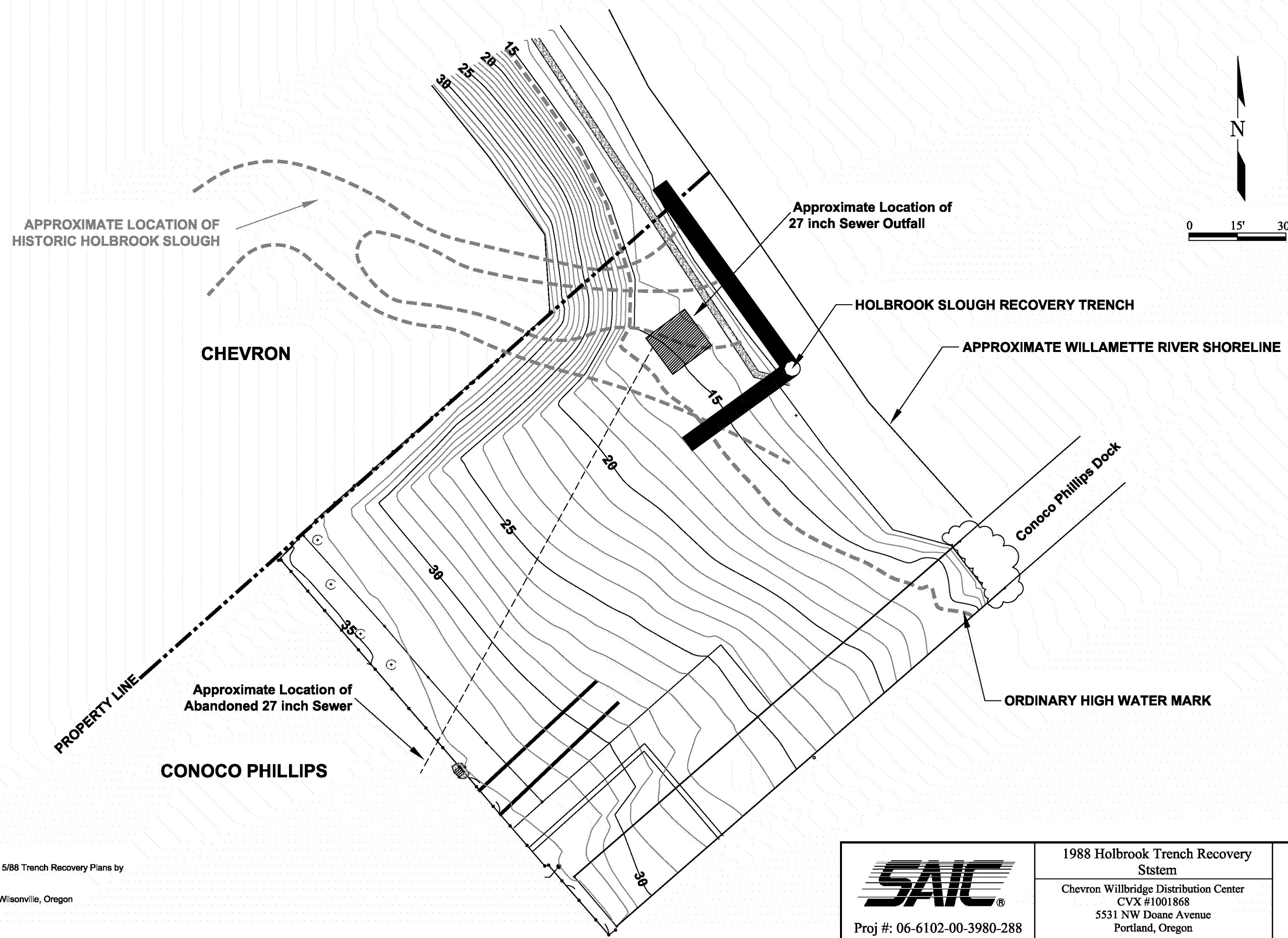
Chevron Willbridge Distribution Center  
CVX #1001868  
5531 NW Doane Avenue  
Portland, Oregon

Date: 07/28/04

Drawn By: EML


FIGURE

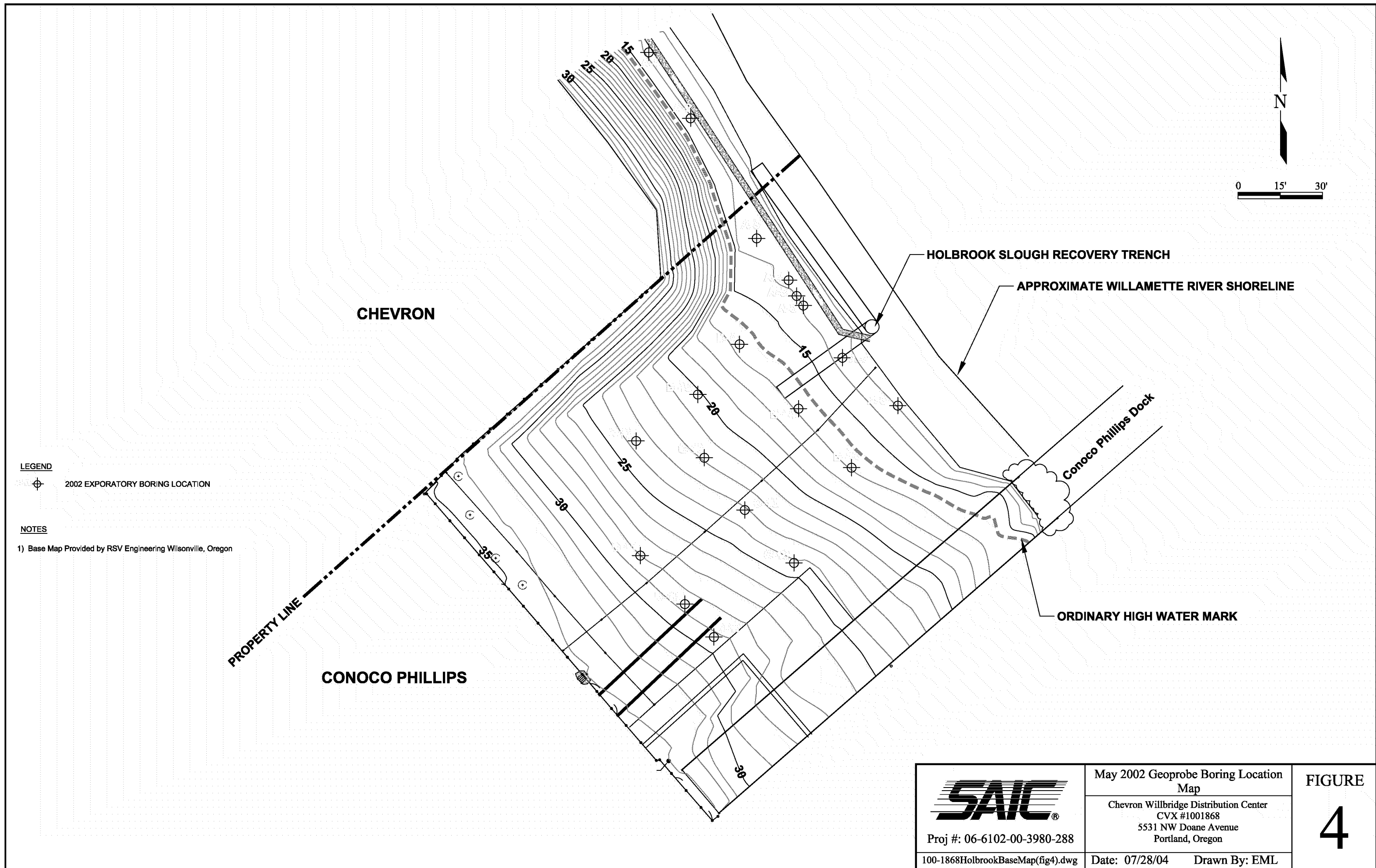
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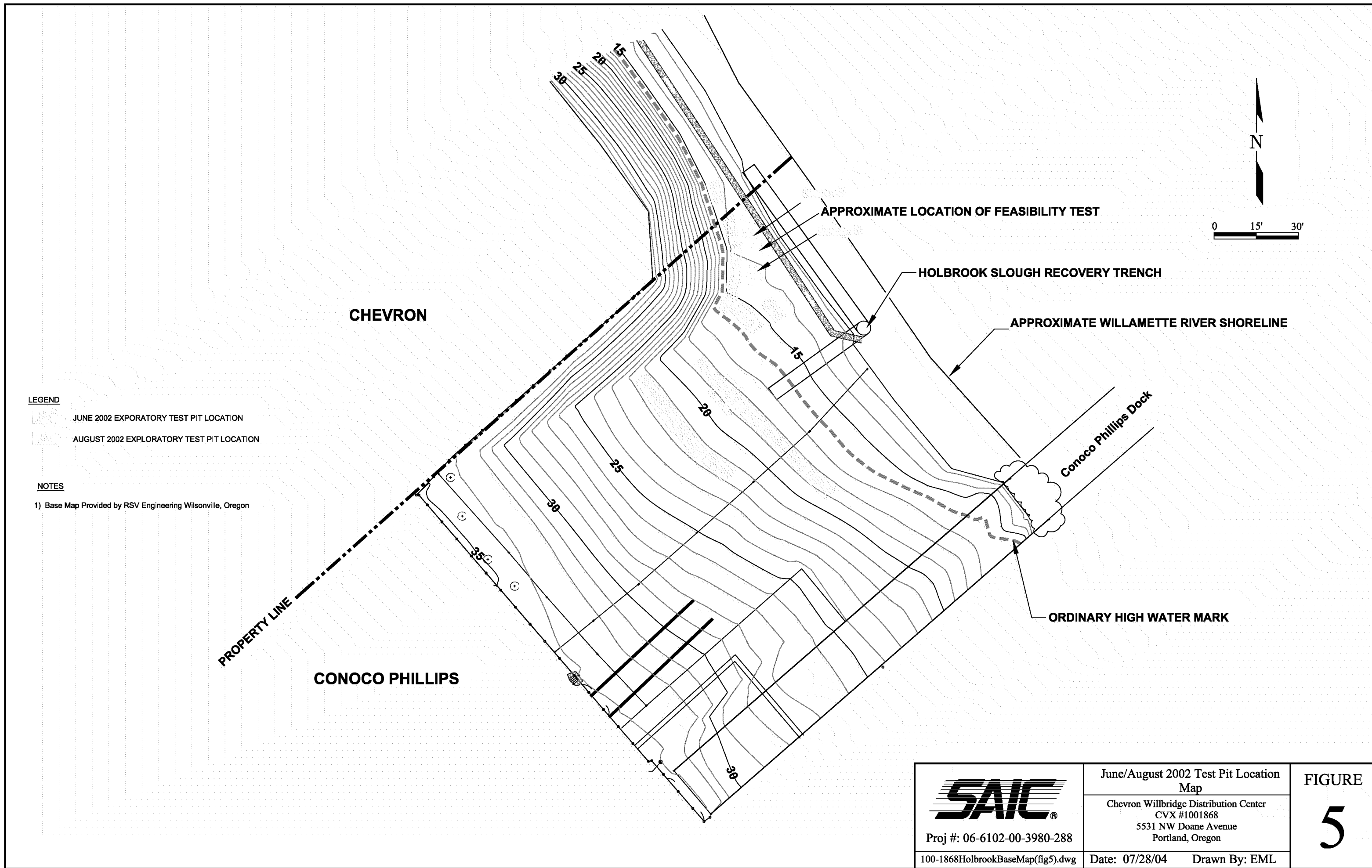


NOTES

- 1) Location of Holbrook Slough Inferred from 5/88 Trench Recovery Plans by Riedel Environmental
- 2) Base Map Provided by RSV Engineering Wilsonville, Oregon

 Proj #: 06-6102-00-3980-288 100-1868HolbrookBaseMap(fig3).dwg	1988 Holbrook Trench Recovery System	FIGURE 3
	Chevron Willbridge Distribution Center CVX #1001868 5531 NW Doane Avenue Portland, Oregon	
	Date: 07/28/04    Drawn By: EML	






LEGEND

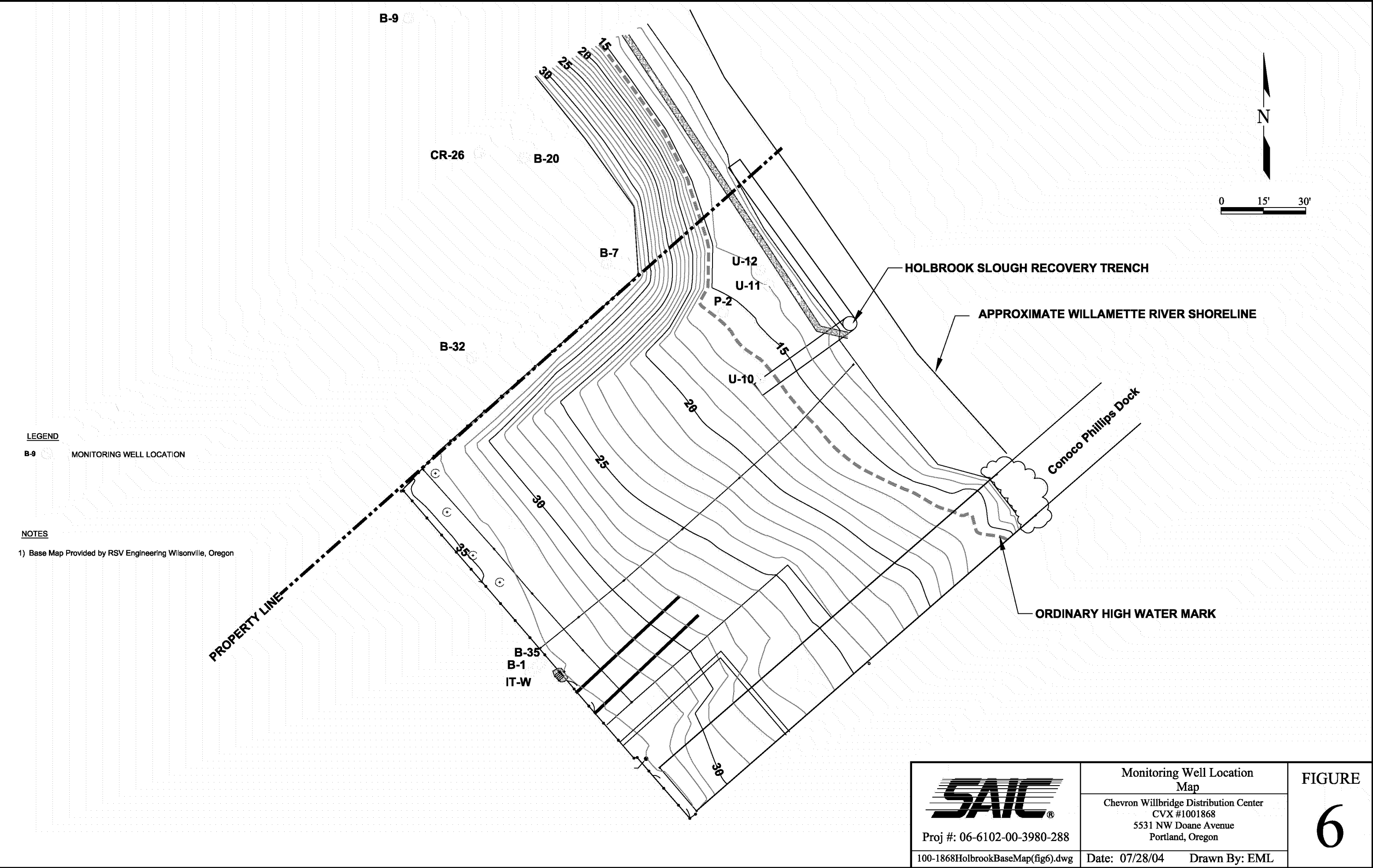
- JUNE 2002 EXPLORATORY TEST PIT LOCATION
- AUGUST 2002 EXPLORATORY TEST PIT LOCATION

NOTES

1) Base Map Provided by RSV Engineering Wilsonville, Oregon

 Proj #: 06-6102-00-3980-288 100-1868HolbrookBaseMap(fig5).dwg	June/August 2002 Test Pit Location Map	FIGURE 5
	Chevron Willbridge Distribution Center CVX #1001868 5531 NW Doane Avenue Portland, Oregon	
Date: 07/28/04 Drawn By: EML		





## **TABLES**

**TABLE 1**  
**SUMMARY OF SOIL ANALYTICAL DATA FROM JUNE 2002 TEST PITS - TPH**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Sample Location (depth in feet)	Sample Date	TPH-G (mg/kg)	TPH-D (mg/kg)	TPH-O (mg/kg)
T-1	6/24/02	<20.0	<b>6,940</b>	<100
T-4	6/24/02	<20.0	<50.0	<100
T-5	6/24/02	<20.0	<50.0	<100
T-6	6/24/02	<b>189</b>	<b>941</b>	<100
T-7	6/24/02	<b>329</b>	<b>2,670</b>	<100
T-8	6/24/02	<20.0	<b>20,600</b>	<100

Notes:

mk/kg = milligrams per kilogram (parts per million)

"<" = Indicates analyte not detected above detection limit shown

TPH-G = Total Petroleum Hydrocarbons as Gasoline by Northwest  
Method NWTPH-Gx.

TPH-D = Total Petroleum Hydrocarbons as Diesel Fuel by Northwest  
Method NWTPH-Dx.

TPH-O = Total Petroleum Hydrocarbons as Heavy Oil by Northwest  
Method NWTPH-Dx.

**BOLD** = Analyte detected above the method reporting limit

**TABLE 2**  
**SUMMARY OF SOIL ANALYTICAL DATA FROM JUNE 2002 TEST PITS - VOCs**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Analyte	T-1	T-4	T-5	T-6	T-7	T-8
	6/24/02	6/24/02	6/24/02	6/24/02	6/24/02	6/24/02
	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Benzene	<500	<100	<100	<100	<100	<100
Toluene	<500	<100	<100	<100	<100	<100
Ethylbenzene	<500	<100	<100	<100	<100	<100
Total Xylenes	<1500	<300	<300	<300	<300	<300
1,2-Dibromoethane	<500	<100	<100	<100	<100	<100
1,2-Dichloroethane	<500	<100	<100	<100	<100	<100
1,2,4-Trimethylbenzene	<500	<100	<100	<100	<100	<100
1,3,5-Trimethylbenzene	<500	<100	<100	<100	<100	<100
Isopropylbenzene	<b>1140</b>	<200	<200	<b>454</b>	<b>773</b>	<b>494</b>
MTBE	<500	<100	<100	<100	<100	<100
n-Butylbenzene	<b>2740</b>	<500	<500	<b>1020</b>	<b>3060</b>	<b>2420</b>
n-Propylbenzene	<b>3710</b>	<100	<100	<b>1860</b>	<b>3630</b>	<b>1110</b>
Naphthalene	<1000	<200	<200	<200	<200	<200
Methylene Chloride	<2500	<500	<500	<500	<500	<500
p-Isopropyltoluene	<1000	<200	<200	<200	<b>426</b>	<200
sec-Butylbenzene	<b>974</b>	<100	<100	<b>301</b>	<b>819</b>	<b>1570</b>
tert-Butylbenzene	<500	<100	<100	<100	<b>185</b>	<b>205</b>
Other VOCs	ND	ND	ND	ND	-	ND

Notes:

ug/kg = micrograms per kilogram (parts per billion)

MTBE = Methyl tert-butyl ether

Volatile Organic Compound (VOC) analysis by EPA Method 8260B

- = Not available or not applicable

"<" = Indicates analyte not detected above detection limit shown

**BOLD** = Analyte detected above the method reporting limit

ND = Not detected above method reporting limits

**TABLE 3**  
**SUMMARY OF SOIL ANALYTICAL DATA FROM JUNE 2002 TEST PITS - PAHs**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Analyte	T-1	T-8
	6/24/02	6/24/02
	(ppb)	(ppb)
Acenaphthene	<670	<b>1,130</b>
Acenaphthylene	<670	<670
Anthracene	<b>469</b>	<b>1,060</b>
Benzo(a)anthracene	<134	<134
Benzo(a)pyrene	<134	<134
Benzo(b)fluoranthene	<134	<134
Benzo(g,h,i)perylene	<134	<134
Benzo(k)fluoranthene	<134	<134
Chrysene	<134	<b>146</b>
Dibenzo(a,h)anthracene	<134	<134
Fluoranthene	<b>143</b>	<670
Fluorene	<b>3,370</b>	<b>4,530</b>
Indeno(1,2,3-cd)pyrene	<134	<134
Naphthalene	<1,340	<3,350
Phenanthrene	<b>4,150</b>	<b>5,640</b>
Pyrene	<b>142</b>	<b>820</b>

Notes:

ug/kg = micrograms per kilogram

PAH = Polynuclear Aromatic Hydrocarbons by EPA Method 8270M-SIM.

"<" = Indicates analyte not detected above detection limit shown

**BOLD** = Analyte detected above the method reporting limit

**TABLE 4**  
**SUMMARY OF SOIL ANALYTICAL DATA FROM JUNE 2002 TEST PITS - METALS**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Analyte	T-1	T-8
	6/24/02	6/24/02
	(mg/kg)	(mg/kg)
Arsenic	<b>2.30</b>	<b>2.61</b>
Barium	<b>145</b>	<b>77.3</b>
Cadmium	<0.439	<0.424
Chromium	<b>27.5</b>	<b>16.6</b>
Lead	<b>12.9</b>	<b>12.9</b>
Mercury	<0.0862	<0.0862
Selenium	<0.439	<0.424
Silver	<0.439	<0.424

Notes:

mk/kg = milligrams per kilogram (parts per million)

ND = Not detected above method reporting limits

"<" = Indicates analyte not detected above detection limit shown

Total Metals analysis by EPA 6000/7000 Series Methods

**BOLD** = detected above Method Reporting Limit

**TABLE 5**  
**SUMMARY OF SOIL ANALYTICAL DATA FROM JUNE 2002 TEST PITS - PCBs**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Analyte	T-1	T-8
	6/24/02	6/24/02
	(ug/kg)	(ug/kg)
Aroclor 1016	<67.0	<67.0
Aroclor 1221	<134	<134
Aroclor 1232	<67.0	<67.0
Aroclor 1242	<67.0	<67.0
Aroclor 1248	<67.0	<67.0
Aroclor 1254	<67.0	<67.0
Aroclor 1260	<67.0	<67.0

Notes:

ug/kg = micrograms per kilogram (parts per million)

PCB = Polychlorinated Biphenyl by EPA Method 8082

"<" = Indicates analyte not detected above detection limit shown

**TABLE 6**  
**SUMMARY OF GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Well I.D. (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-1</b>	2/14/2000	16.82	NP	-	17.86	NA
(34.68)	5/22/2000	17.05	NP	-	17.63	NA
	8/22/2000	17.48	NP	-	17.20	NA
	11/27/2000	17.82	NP	-	16.86	NA
	2/20/2001	17.71	NP	-	16.97	NA
	5/15/2001	17.68	NP	-	17.00	NA
	9/18/2001	18.01	NP	-	16.67	NA
	12/20/2001	17.10	NP	-	17.58	NA
	3/13/2002	16.77	NP	-	17.91	NA
	6/24/2002	17.32	NP	-	17.36	NA
	9/26/2002	17.74	NP	-	16.94	NA
	12/20/2002	17.57	NP	-	17.11	NA
	3/17/2003	16.97	NP	-	17.71	NA
	6/26/2003	17.24	NP	-	17.44	NA
<b>B-7</b>	2/14/2000	18.33	NP	-	17.40	0.1
(35.73)	5/22/2000	18.60	NP	-	17.13	NA
	8/22/2000	19.31	19.30	0.01	16.43	0.1
	11/27/2000	19.47	sheen	-	16.26	NA
	2/20/2001	19.37	NP	-	16.36	NA
	5/15/2001	19.36	sheen	-	16.37	NA
	9/19/2001	19.74	NP	-	15.99	NA
	12/20/2001	18.30	NP	-	17.43	NA
	3/15/2002	18.28	NP	-	17.45	NA
	9/23/2002	18.79	18.78	0.01	16.95	NA
	12/19/2002	19.78	19.79	0.01	15.96	NA
	3/19/2003	18.58	18.57	0.01	17.16	NA
<b>B-9</b>	2/14/2000	16.29	16.20	0.09	19.35	0.0
(35.57)	5/22/2000	16.90	NP	-	18.67	NA
	8/22/2000	17.48	NP	-	18.09	NA
	11/27/2000	17.29	NP	-	18.28	NA
	2/20/2001	17.41	NP	-	18.16	NA
	5/15/2001	17.04	NP	-	18.53	NA
	9/19/2001	17.84	NP	-	17.73	NA
	12/20/2001	15.92	NP	-	19.65	NA
	3/5/2002	15.92	NP	-	19.65	NA
	9/23/2002	17.75	NP	-	17.82	NA
	12/19/2002	17.28	NP	-	18.29	NA
	3/19/2003	16.18	NP	-	19.39	NA



**TABLE 6**  
**SUMMARY OF GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Well I.D. (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>B-20</b>	2/14/2000	16.62	NP	-	16.70	NA
(33.32)	5/22/2000	16.93	NP	-	16.39	NA
	8/22/2000	17.78	NP	-	15.54	NA
	11/27/2000	17.99	sheen	-	15.33	NA
	2/20/2001	17.79	sheen	-	15.53	NA
	5/15/2001	17.89	NP	-	15.43	NA
	9/19/2001	18.40	NP	-	14.92	NA
	12/20/2001	16.61	NP	-	16.71	NA
	3/15/2002	16.45	NP	-	16.87	NA
	9/23/2002	18.27	NP	-	15.05	NA
	12/19/2002	18.22	NP	-	15.10	NA
	3/19/2003	15.96	NP	-	17.36	NA
<b>B-32</b>	2/14/2000	16.37	NP	-	17.86	NA
(34.23)	5/22/2000	26.84	NP	-	7.39	NA
	8/22/2000	17.65	NP	-	16.58	NA
	11/27/2000	17.93	NP	-	16.30	NA
	2/20/2001	17.71	NP	-	16.52	NA
	5/15/2001	17.74	NP	-	16.49	NA
	9/19/2001	18.17	NP	-	16.06	NA
	12/20/2001	16.74	NP	-	17.49	NA
	3/15/2002	16.55	NP	-	17.68	NA
	9/23/2002	18.32	18.32	Sheen	15.91	NA
	12/19/2002	18.15	NP	-	16.08	NA
	3/19/2003	16.83	NP	-	17.40	NA
<b>B-35</b>	2/14/2000	15.71	NP	-	17.85	NA
(33.56)	5/22/2000	16.00	NP	-	17.56	NA
	8/22/2000	16.36	NP	-	17.20	NA
	11/27/2000	16.71	NP	-	16.85	NA
	2/20/2001	16.65	NP	-	16.91	NA
	5/15/2001	15.56	NP	-	18.00	NA
	9/18/2001	16.90	NP	-	16.66	NA
	12/20/2001	15.95	NP	-	17.61	NA
	3/13/2002	15.70	NP	-	17.86	NA
	6/24/2002	16.22	NP	-	17.34	NA
	9/26/2002	16.64	NP	-	16.92	NA
	12/20/2002	16.48	NP	-	17.08	NA
	3/17/2003	15.91	NP	-	17.65	NA
	6/26/2003	16.13	NP	-	17.43	NA

**TABLE 6**  
**SUMMARY OF GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Well I.D. (TOC)	Date Gauged	Depth to Groundwater	Depth to SPH (feet)	SPH Thickness (feet)	Groundwater Elevation	SPH Recovered* (gallons)
<b>IT-W</b>	2/14/2000	17.46	NP	-	18.53	NA
(35.99)	5/22/2000	17.75	NP	-	18.24	NA
	8/22/2000	18.17	NP	-	17.82	NA
	11/27/2000	18.51	NP	-	17.48	NA
	2/20/2001	18.43	NP	-	17.56	NA
	5/15/2001	18.33	NP	-	17.66	NA
	9/18/2001	18.68	NP	-	17.31	NA
	12/20/2001	17.76	NP	-	18.23	NA
	3/13/2002	17.50	NP	-	18.49	NA
	6/24/2002	17.98	NP	-	18.01	NA
	9/26/2002	18.40	NP	-	17.59	NA
	12/20/2002	18.28	NP	-	17.71	NA
	3/17/2003	17.70	NP	-	18.29	NA
	6/26/2003	17.94	NP	-	18.05	NA
<b>P-2</b>	2/14/2000	4.18	NP	-	13.67	NA
(17.85)	5/22/2000	4.66	NP	-	13.19	NA
	8/22/2000	5.27	NP	-	12.58	NA
	11/27/2000	5.28	NP	-	12.57	NA
	2/20/2001	5.32	NP	-	12.53	NA
	5/15/2001	5.18	NP	-	12.67	NA
	9/18/2001	5.50	NP	-	12.35	NA
	12/20/2001	4.21	NP	-	13.64	NA
	3/13/2002	4.40	NP	-	13.45	NA
	6/24/2002	3.26	NP	-	14.59	NA
	9/26/2002	5.74	NP	-	12.11	NA
	12/20/2002	5.93	NP	-	11.92	NA
	3/17/2003	4.84	NP	-	13.01	NA
	6/26/2003	5.31	NP	-	12.54	NA
<b>NOTES:</b> NP = No measurable product NA = Not Applicable NM = Not Measured NR = None Recovered * = SPH Recovered for latest quarter monitored - = No measurable product thickness Groundwater elevations for wells with product thicknesses have been corrected using 0.8 GWE = TOC -(DTW - (0.8 x DTP - DTW)) Where 0.8 = The density of the SPH						

**TABLE 7**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Well Identification	Date Sampled	Benzene (µg/l)	Ethylbenzene (µg/l)	Toluene (µg/l)	Xylenes (µg/l)
<b>B-7</b>	02/18/00	ND	ND	20.1	44.8
	05/23/00	ND	1.41	0.678	1.22
dup	05/23/00	ND	1.06	0.691	ND
	08/25/00	NS/F	NS/F	NS/F	NS/F
	11/30/00	NS/S	NS/S	NS/S	NS/S
	02/22/01	0.690	ND	0.736	ND
	05/17/01	ND	ND	0.700	ND
	03/20/03	ND	ND	0.740	ND
	09/29/03	<0.500	<0.500	0.870	1.93
	03/30/04	<0.500	<0.500	0.750	<1.00
<b>B-9</b>	05/23/00	ND	0.737	0.535	ND
	08/25/00	ND	ND	ND	ND
	11/30/00	ND	ND	ND	ND
	02/22/01	ND	ND	ND	ND
	05/17/01	ND	ND	ND	ND
	09/19/01	ND	0.913	ND	ND
	03/21/02	ND	ND	ND	ND
	09/24/02	ND	ND	ND	ND
	03/20/03	ND	ND	ND	ND
	03/30/04	<0.500	<0.500	0.560	<1.00
<b>B-20</b>	03/20/03	ND	ND	ND	ND
	09/29/03	<0.500	<0.500	<0.500	1.38
	03/30/04	<0.500	<0.500	<0.500	<1.00
<b>B-32</b>	03/20/03	ND	ND	ND	ND
	09/29/03	<0.500	0.636	<0.500	<1.00
	03/29/04	<0.500	<0.500	<0.500	<1.00
<b>B-35</b>	02/17/00	31.6	11	13.5	27.4
	05/26/00	194	12.5	16.3	39.8
	08/28/00	287	8.42	15.3	ND
	11/29/00	384	12.0	17.0	30.2
	02/23/01	45.6	12.4	4.87	20.5
	05/17/01	15.2	5.62	4.32	7.99
	09/20/01	58.0	9.78	3.31	15.9
	03/14/02	34.1	2.41	15.8	11.4
	09/26/02	95.8	14.0	11.3	26.3
	03/18/03	8.11	1.42	6.39	3.20
	09/25/03	66.7	3.74	7.41	19.2
	03/30/04	15.1	6.49	1.39	13.0
<b>P-2</b>	03/17/03	ND	ND	0.534	ND
	09/25/03	<0.500	0.823	<0.500	<1.00
	03/30/04	0.540	<0.500	<0.500	<1.00
<b>U-10</b>	03/18/03	ND	ND	ND	ND
	09/25/03	<0.500	<0.500	<0.500	<1.00
	03/30/04	0.680	<0.500	2.08	4.01

**TABLE 7**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - BTEX COMPOUNDS**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Well Identification	Date Sampled	Benzene (µg/l)	Ethylbenzene (µg/l)	Toluene (µg/l)	Xylenes (µg/l)
<b>U-11</b>	03/18/03	ND	ND	ND	ND
	09/25/03	1.74	1.04	1.37	1.74
	03/30/04	<0.500	<0.500	<0.500	<1.00
dup	03/30/04	0.650	<0.500	1.93	3.26
<b>U-12</b>	03/18/03	5.30	0.642	2.12	3.72
	09/25/03	<0.500	<0.500	0.563	2.00
	03/30/04	<0.500	<0.500	<0.500	<1.00
<b>Notes:</b> 2/00 and 5/00 data from IT Corporation 8/00, 11/00, 2/01 and 5/01 data from KHM Environmental Management, Inc. NS/F = Not sampled floating product present NS/S = Not sampled sheen present µg/l = Micrograms per Liter (parts per billion) ND = Not detected at or above detection limit < = Indicates analyte not detected above detection limit shown BTEX analysis by USEPA Method 8021B dup* = duplicate for B-30 submitted as blind duplicate labeled as B-50 dup**= duplicate for B-30 submitted as blind duplicate labeled as B-31 dup*** = duplicate for B-30 submitted as blind duplicate labeled as B-99 TB-LB = trip blank					

**TABLE 8**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
ChevronTexaco ConocoPhillips Terminals-  
Portland, Oregon

Well I.D.	Date Sampled	Acenaphthene (µg/l)	Acenaphthylene (µg/l)	Anthracene (µg/l)	Benzo (a) anthracene (µg/l)	Benzo (a) pyrene (µg/l)	Benzo (b) fluoranthene (µg/l)	Benzo (g,h,i) perylene (µg/l)	Benzo (k) fluoranthene (µg/l)	Chrysene (µg/l)	Dibenzo (a,h) anthracene (µg/l)	Fluoranthene (µg/l)	Fluorene (µg/l)	Indeno (1,2,3-cd) pyrene (µg/l)	Naphthalene (µg/l)	Phenanthrene (µg/l)	Pyrene (µg/l)
<b>B-7</b>	02/18/00	5.22	ND	ND	ND	ND	ND	ND	ND	0.528	ND	7.26	16.3	ND	ND	17.6	0.962
	05/23/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	17.2	ND	ND	13.6	ND
	dup 05/23/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20.9	ND	ND	15.8	ND
	08/25/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/22/01	1.33	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.64	ND	ND	2.82	ND
	05/17/01	0.934	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.59	ND	ND	0.564	ND
	03/20/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/29/03	2.12	ND	0.287	ND	ND	ND	ND	ND	ND	ND	ND	7.74	ND	ND	6.11	ND
	03/30/04	1.95	<0.200	0.436	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	7.73	<0.200	<1.60	5.95	<0.200
<b>B-9</b>	02/18/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	05/23/00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.43	ND	ND	1.3	ND
	08/25/00	2.60	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.40	ND	ND	1.33	ND
	11/30/00	0.700	ND	0.600	0.460	0.240	0.400	ND	ND	ND	ND	ND	6.70	ND	0.780	0.200	0.160
	02/22/01	1.78	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.20	ND	ND	0.528	ND
	05/17/01	1.50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.60	ND	ND	0.386	ND
	09/19/01	1.08	0.240	ND	ND	ND	ND	0.120	ND	ND	0.100	ND	4.00	0.100	0.260	0.780	0.100
	03/21/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	09/24/02	1.40	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.09	ND	ND	0.358	ND
	03/20/03	0.242	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.508	ND	ND	ND	ND
	09/30/03	1.29	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.38	ND	ND	0.265	ND
	03/30/04	0.964	<0.300	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	3.10	<0.200	<1.50	0.951	0.234
<b>B-20</b>	03/20/03	0.322	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.577	ND	ND	ND	ND
	09/29/03	1.52	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.86	ND	ND	4.27	ND
	03/30/04	1.07	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	3.81	<0.200	<1.50	0.988	<0.200

**TABLE 8**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
ChevronTexaco ConocoPhillips Terminals-  
Portland, Oregon

Well I.D.	Date Sampled	Acenaphthene (µg/l)	Acenaphthylene (µg/l)	Anthracene (µg/l)	Benzo (a) anthracene (µg/l)	Benzo (a) pyrene (µg/l)	Benzo (b) fluoranthene (µg/l)	Benzo (g,h,i) perylene (µg/l)	Benzo (k) fluoranthene (µg/l)	Chrysene (µg/l)	Dibenzo (a,h) anthracene (µg/l)	Fluoranthene (µg/l)	Fluorene (µg/l)	Indeno (1,2,3-cd) pyrene (µg/l)	Naphthalene (µg/l)	Phenanthrene (µg/l)	Pyrene (µg/l)
<b>B-32</b>	03/20/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.161	ND	ND	ND	0.108
	09/29/03	ND	ND	ND	0.114	0.112	0.114	ND	0.114	0.188	ND	0.557	1.06	ND	ND	ND	0.498
<b>B-35</b>	02/17/00	11	ND	5.15	1.19	ND	ND	ND	ND	1.1	ND	8.29	30	ND	ND	35.8	4.33
	05/26/00	ND	ND	2.61	ND	ND	ND	ND	ND	ND	ND	2.93	22.5	ND	ND	20.7	1.73
	08/28/00	6.77	ND	0.807	0.123	ND	ND	ND	ND	0.127	ND	1.12	13.7	ND	ND	8.35	0.584
	11/29/00	2.84	0.360	0.520	0.240	ND	ND	ND	ND	0.200	ND	1.46	6.30	ND	1.22	7.16	0.760
	02/23/01	8.44	ND	ND	0.304	ND	0.102	ND	ND	0.330	ND	ND	16.2	ND	ND	17.3	1.15
	05/17/01	4.34	ND	0.493	0.103	ND	ND	ND	ND	0.106	ND	0.692	11.3	ND	ND	5.50	0.425
	09/20/01	2.92	0.360	0.680	0.200	ND	0.120	ND	ND	0.200	ND	1.20	6.74	ND	1.00	10.0	0.700
	03/14/02	3.02	ND	0.620	ND	ND	ND	ND	ND	ND	ND	0.844	7.62	ND	ND	6.78	0.468
	09/26/02	4.76	ND	0.740	0.109	ND	ND	ND	ND	ND	ND	1.00	11.6	ND	ND	9.41	0.570
	03/18/03	3.46	ND	0.493	ND	ND	ND	ND	ND	ND	ND	0.578	14.3	ND	ND	7.51	0.434
	09/25/03	5.36	ND	0.779	ND	ND	ND	ND	ND	ND	ND	0.884	10.2	ND	ND	8.86	0.399
	03/30/04	3.52	<0.200	0.456	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	0.419	7.21	<0.200	<2.10	5.18	0.274
<b>P-2</b>	03/17/03	2.61	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.62	ND	ND	2.05	ND
	9/25/03 <sup>2</sup>	1.93	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.85	ND	ND	4.23	ND
	03/30/04	1.97	<0.200	<0.300	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	7.66	<0.200	<1.70	3.28	<0.200
<b>U-10</b>	03/18/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.345	ND	ND
	09/25/03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/30/04	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	0.0302	<0.0200	<0.0200
<b>U-11</b>	03/18/03	0.711	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.44	ND	ND	0.951	ND
	09/25/03	1.45	ND	0.229	ND	ND	ND	ND	ND	ND	ND	0.391	4.69	ND	ND	3.25	0.396
	03/30/04	1.73	<0.200	0.395	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	<0.200	0.610	5.29	<0.200	<2.60	4.32	0.821

**TABLE 8**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - PAH COMPOUNDS**  
ChevronTexaco ConocoPhillips Terminals-  
Portland, Oregon

Well I.D.	Date Sampled	Acenaphthene (µg/l)	Acenaphthylene (µg/l)	Anthracene (µg/l)	Benzo (a) anthracene (µg/l)	Benzo (a) pyrene (µg/l)	Benzo (b) fluoranthene (µg/l)	Benzo (g,h,i) perylene (µg/l)	Benzo (k) fluoranthene (µg/l)	Chrysene (µg/l)	Dibenzo (a,h) anthracene (µg/l)	Fluoranthene (µg/l)	Fluorene (µg/l)	Indeno (1,2,3-cd) pyrene (µg/l)	Naphthalene (µg/l)	Phenanthrene (µg/l)	Pyrene (µg/l)
U-12	03/18/03	1.72	ND	0.308	ND	ND	ND	ND	ND	ND	ND	0.384	7.94	ND	ND	3.91	0.541
	09/25/03	0.277	ND	0.138	ND	ND	ND	ND	ND	ND	ND	ND	1.25	ND	0.231	1.59	ND
	03/30/04	0.151	<0.0400	<0.0600	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	<0.0400	0.621	<0.0400	<0.320	0.238	0.0434

**NOTES:**

- = Not sampled, not analyzed, not applicable  
µg/l = Micrograms per Liter (parts per billion)  
ND = Not detected at or above method detection limit  
< = Indicates analyte not detected above detection limit shown  
2/00 and 5/00 data from IT Corporation  
8/00, 11/00, 2/01 and 5/01 data from KHM Environmental Management, Inc.  
IT Corp Data recorded as reported in Second Quarter 2000 Report  
NS/F = Not sampled floating product present  
NS/S = Not sampled sheen present  
1 = Sample rerun outside of hold time due to low surrogate recovery reported in the initial sample as a result of an extraction error.  
2 = Sample ID was misidentified by the laboratory as D-2  
dup\* = duplicate for B-30 submitted as blind duplicate labeled as B-50  
dup\*\*= duplicate for B-30 submitted as blind duplicate labeled as B-31  
dup\*\*\*= duplicate for B-30 submitted as blind duplicate labeled as B-130  
PAHs by EPA Method 8270M-SIM

**TABLE 9**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Well I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
<b>B-7</b>	02/18/00	0.028	0.122	0.00107	0.0066	0.0134	0.00425	ND	0.00125	ND	0.0234
	05/23/00	0.0268	0.228	ND	0.0264	0.0441	0.0115	ND	0.00193	ND	0.0863
	dup 05/23/00	0.0276	0.259	ND	0.0304	0.051	0.0137	ND	0.00211	ND	0.104
	08/25/00	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F	NS/F
	11/30/00	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S	NS/S
	02/22/01	0.0310	0.0719	ND	ND	0.00311	ND	ND	ND	ND	0.00513
	05/17/01	0.0364	0.0587	ND	ND	0.00157	ND	ND	ND	ND	ND
	03/20/03	0.0275	0.0642	ND	ND	0.0209	ND	ND	ND	ND	ND
	09/29/03	0.0304	0.0815	ND	0.00278	0.00608	0.00121	ND	0.00132	ND	0.00782
	03/30/04	0.0303	0.0869	0.00138	0.00320	0.00647	0.00175	<0.000200	<0.00100	<0.00100	0.0135
	<b>B-9</b> 05/23/00	0.0177	0.139	ND	0.0176	0.0286	0.00848	ND	0.00123	ND	0.0616
	08/25/00	0.0116	0.0534	ND	0.00270	0.00750	0.00214	ND	ND	ND	0.0228
	11/30/00	0.0108	0.153	0.00149	0.0159	0.0354	0.0114	ND	0.00125	ND	0.0823
	02/22/01	0.0173	0.0460	ND	ND	0.00213	ND	ND	0.00127	ND	ND
	05/17/01	0.0208	0.0706	ND	0.00444	0.00634	0.00241	ND	ND	ND	0.0161
	09/19/01	0.0161	0.0753	ND	0.00256	0.00993	0.00266	ND	ND	ND	0.0136
	03/21/02	0.0105	0.0488	ND	0.00257	0.00683	0.00398	ND	ND	ND	0.0506
	09/24/02	0.0185	0.0469	ND	ND	ND	ND	ND	ND	ND	ND
	03/20/03	0.00992	0.0401	ND	0.00165	0.00421	0.00317	ND	ND	ND	0.0283
	09/30/03	0.00905	0.137	0.00136	0.00812	0.0285	0.0155	ND	ND	ND	0.0532
	03/30/04	0.0384	0.349	0.00382	0.0395	0.0991	0.0467	<0.000200	0.00147	<0.00100	0.331
	<b>B-20</b> 03/20/03	0.0107	0.0459	ND	0.00109	0.00389	ND	ND	ND	ND	0.00501
	09/29/03	0.130	4.35	0.0494	0.808	1.14	0.643	0.000934	0.00840	ND	3.96
	03/30/04	0.00165	0.0417	<0.00100	0.00184	0.00508	0.00121	<0.00200	<0.00100	<0.00100	0.00910
<b>B-32</b>	03/20/03	0.00367	0.0429	ND	0.00110	ND	ND	ND	ND	ND	ND
	09/29/03	0.122	6.84	0.0170	1.04	1.64	1.15	0.000754	0.0190	ND	3.74
	03/29/04	0.00917	0.434	0.00202	0.0615	0.108	0.0387	0.000221	0.0224	<0.00100	0.215
<b>B-35</b>	02/17/00	0.0602	0.480	0.00062	0.0893	0.122	0.0828	ND	0.00164	0.00021	0.311
	05/26/00	0.0102	0.116	ND	0.00786	0.0114	0.00264	ND	0.0013	ND	0.0233
	08/28/00	0.0377	0.128	0.00153	0.00467	0.00612	0.00643	ND	ND	ND	0.0339
	11/29/00	0.0468	0.131	ND	0.00316	0.00691	0.00619	ND	0.00212	ND	0.0208
	02/23/01	0.0347	0.0816	ND	0.00200	0.00380	0.00305	ND	0.00100	ND	0.0308
	05/17/01	0.0504	0.153	ND	0.0107	0.0141	0.0106	ND	ND	ND	0.0511
	09/20/01	0.0344	0.0901	ND	0.00178	0.00420	0.00160	ND	ND	ND	0.00632
	03/14/02	0.0335	0.308	ND	0.0463	0.0534	0.0298	ND	0.00139	0.00145	0.146
	09/26/02	0.0296	0.225	ND	0.0298	0.0314	0.0147	ND	0.00131	ND	0.0816
	03/18/03	0.0387	0.0958	ND	0.00155	0.00422	0.00277	ND	ND	ND	0.00700
	09/25/03	0.0517	0.132	ND	0.00334	0.00631	0.00536	ND	ND	ND	0.0171
	3/30/04	0.0291	0.135	<0.00100	0.0119	0.0149	0.00779	<0.000200	<0.00100	<0.00100	0.0152
<b>P-2</b>	03/17/03	0.0111	0.0783	ND	0.00232	0.00722	0.00288	ND	ND	0.00106	0.00979
	9/25/03 <sup>1</sup>	0.00966	0.116	ND	0.00443	0.0116	0.00553	ND	0.00109	ND	0.0137
	03/30/04	0.00805	0.131	<0.00100	0.00187	0.00447	0.00126	<0.000200	<0.00100	<0.00100	0.0123
<b>U-10</b>	03/18/03	0.107	3.39	ND	0.313	0.403	0.176	0.000551	ND	ND	1.22
	09/25/03	0.00975	0.196	ND	0.0132	0.0149	0.00904	ND	ND	ND	0.0493
	03/30/04	0.0316	0.128	<0.00100	0.00481	0.00573	0.0225	<0.000200	<0.00100	<0.00100	0.0288



**TABLE 9**  
**SUMMARY OF GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Well I.D.	Sample Date	Arsenic (mg/l)	Barium (mg/l)	Cadmium (mg/l)	Chromium (mg/l)	Copper (mg/l)	Lead (mg/l)	Mercury (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)
U-11	03/18/03	0.00942	0.372	ND	0.0297	0.0339	0.0336	0.000211	0.00153	ND	0.110
	09/25/03	0.0343	0.0893	ND	0.00220	0.00287	0.00830	ND	0.00101	ND	0.0124
	03/30/04	0.00679	0.363	<0.00100	0.0341	0.312	0.0212	<0.000200	0.00165	<0.00100	0.103
dup	03/30/04	0.0357	0.108	<0.00100	0.00400	0.00594	0.0201	<0.000200	<0.00100	<0.00100	0.0292
U-12	03/18/03	0.0323	0.136	ND	0.00600	0.00711	0.0228	ND	ND	ND	0.0338
	09/25/03	0.0418	1.91	ND	0.362	0.372	0.302	0.000559	0.00480	ND	1.2
	03/30/04	0.00655	0.248	<0.00100	0.0179	0.0233	0.0220	<0.000200	0.00185	<0.00100	0.0728

Notes:

ND - Not detected at laboratory reporting limits

NS/F = Not sampled floating product present

NS/S = Not sampled sheen present

< = Indicates analyte not detected above detection limit shown

mg/l = milligrams per liter (parts per million)

2/00 and 5/00 data from IT Corporation

8/00, 11/00, 2/01 and 5/01 data from KHM Environmental Management, Inc.

Sample locations are shown on Figure 2

Analytical Reports are included in Attachment B

dup\* = duplicate for B-30 submitted as blind duplicate labeled as B-50

dup\*\*= duplicate for B-30 submitted as blind duplicate labeled as B-31

dup\*\*\*= duplicate for B-30 submitted as blind duplicate labeled as B-130

1 = Sample ID was misidentified by the laboratory as D-2

Total Metals Analysis by EPA 6000/7000 Series Methods

## **APPENDIX A**

**APPENDIX A**  
**SUMMARY OF HISTORIC BORING AND TEST PIT LOGS**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Exploratory Boring or Test Pit ID	Date	Depth (feet)	Soil Description	Photo-Ionization Detector Reading (ppm)	Sample Collection
A1	05/02	0-4	Silty gravel with sand	NA	NA
		4-8	Silt, odor and sheen	NA	NA
			Total Depth = 8 feet below grade surface		
			Moist soil encountered at ~4 feet below grade surface; no groundwater.		
A2	05/02	0-0.5	Gravel cover	NA	NA
		0.5-3	Silty gravel with sand	NA	NA
		3-4	Silt, odor and sheen	NA	NA
			Total Depth = 4 feet below grade surface		
			Groundwater not encountered		
A3	05/02	0-0.5	Gravel cover	NA	NA
		0.5-3.5	Silty gravel with sand (refusal)	NA	NA
			<i>Boring continued 5 feet south due to refusal</i>		
		3.5-4.5	Silty sand, odor	NA	NA
		4.5-8	Silt, no odor, moist		
			Total Depth = 8 feet below grade surface	NA	NA
			Moist soil encountered at ~4.5 feet below grade surface, groundwater not encountered.		
A4	05/02	0-0.5	Gravel cover	NA	NA
		0.5-3	Silty gravel with sand	NA	NA
		3-7	Sand (med-grained) trace fines, odor, sheen	NA	NA
		7-8	Sand, some silt, wet	NA	NA
		8-12	No recovery	NA	NA
			Total Depth = 12 feet below grade surface		
			Wet soil encountered at ~7 feet below grade surface, groundwater not encountered.		
A5	05/02	0-6.5	No soils collected, refusal at 6.5 feet below grade surface, groundwater not encountered.	NA	NA
			Total Depth = 6.5 feet below grade surface		
A6	05/02	0-1.5	Gravel cover with some silty sand	NA	NA
		1.5-12	Sand, odor, wet at 7 feet	NA	NA
		12-16	Silt, no odor	NA	NA
			Total Depth = 16 feet below grade surface		
			Wet soil encountered at 7 feet below grade surface, groundwater encountered at ~14 feet below grade surface.		
A7	05/02	0-0.5	Gravel cover	NA	NA
		0.5-1.5	Silty gravel with sand	NA	NA
		1.5-4	Sand no odor, no sheen, damp	NA	NA
		4-8	Sand (med-grained), low recovery	NA	NA
		8-12	Silt, no odor, no sheen, moist	NA	NA
			Total Depth = 12 feet below grade surface		
			Moist soil encountered at ~8 feet below grade surface, groundwater not encountered.		

**APPENDIX A**  
**SUMMARY OF HISTORIC BORING AND TEST PIT LOGS**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Exploratory Boring or Test Pit ID	Date	Depth (feet)	Soil Description	Photo-Ionization Detector Reading (ppm)	Sample Collection
B-9	05/02	0-0.5	Gravel cover	NA	NA
		0.5-3.5	Sand (med-grained) no odor, no sheen	NA	NA
		3.5-4.5	Silt, no odor, no sheen	NA	NA
		4.5-7	Sand, no odor, no sheen	NA	NA
		7-12	Silt, odor, 6" sand zone, slough	NA	NA
			Total Depth = 12 feet below grade surface		
			Groundwater not encountered.		
B-15	05/02	0-0.5	Gravel cover	NA	NA
		0.5-5	Sand (med-grained) no odor, no sheen	NA	NA
		5-8	Silt, odor, no sheen, wet	NA	NA
			Total Depth = 8 feet below grade surface		
			Wet soil encountered at ~5 feet below grade surface, groundwater not encountered.		
B-19	05/02	0-0.5	Gravel cover	NA	NA
		0.5-7.5	Sand (med-grained), no odor, no sheen, damp	NA	NA
		7.5-8.5	Sand (med-grained), with some silt, odor	NA	NA
		8.5-12	Silt, odor, moist	NA	NA
		12-16	No recovery	NA	NA
			Total Depth = 16 feet below grade surface		
			Moist soil encountered at ~8.5 feet below grade surface, groundwater not encountered.		
C-10	05/02	0-0.5	Gravel cover	NA	NA
		0.5-8.5	Sand (med-grained), no odor, no sheen	NA	NA
		8.5-12	Silt, odor, very moist	NA	NA
			Total Depth = 12 feet below grade surface		
			Very moist soil encountered at ~8.5 feet below grade surface, groundwater not encountered.		
C-13	05/02	0-0.5	Gravel cover	NA	NA
		0.5-10	Sand (med-grained), no odor, no sheen, damp	NA	NA
		10-24	Sand (med-grained) odor, sheen, wet at 11.5	NA	NA
		24-28	Sand (med-grained) no odor, no sheen	NA	NA
			Total Depth = 28 feet below grade surface		
			Groundwater encountered at ~11.5 feet below grade surface.		
C-16	05/02	0-0.5	Gravel cover	NA	NA
		0.5-14	Sand (med-grained), no odor, no sheen, damp	NA	NA
		14-16	Silt, odor, moist	NA	NA
			Total Depth = 16 feet below grade surface		
			Moist soil encountered at ~14 feet below grade surface, groundwater not encountered.		

**APPENDIX A**  
**SUMMARY OF HISTORIC BORING AND TEST PIT LOGS**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Exploratory Boring or Test Pit ID	Date	Depth (feet)	Soil Description	Photo-Ionization Detector Reading (ppm)	Sample Collection
D-11	05/02	0-0.5	Gravel cover	NA	NA
		0.5-9.5	Sand (med-grained) no odor, no sheen, damp	NA	NA
		9.5-10	Wood	NA	NA
		10-11	Sand (med-grained) no odor, no sheen	NA	NA
		11-12	Silt, odor, moist	NA	NA
			Total Depth = 12 feet below grade surface		
			Moist soil encountered at ~11 feet below grade surface, groundwater not encountered.		
D-12	05/02	0-0.5	Gravel cover	NA	NA
		0.5-15	Sand (med-grained) no odor, no sheen, damp	NA	NA
		15-16	Sand (med-grained) odor, wet at ~15	NA	NA
		16-24	Sand (med-grained) no odor, no sheen, very moist	NA	NA
			Total Depth = 24 feet below grade surface		
			Groundwater encountered at ~15 feet below grade surface.		
D-17	05/02	0-1	Sand, damp	NA	NA
		1-2	Gravel cover, no odor, no sheen	NA	NA
		2-15	Sand (med-grained) no odor, no sheen	NA	NA
		15-17	Sand (med-grained) odor, wet at ~15	NA	NA
		17-20	Silt, odor, very moist	NA	NA
			Total Depth = 20 feet below grade surface		
			Groundwater encountered at ~15 feet below grade surface.		
D-18	05/02	0-0.5	Gravel cover	NA	NA
		0.5-9	Sand (med-grained) no, odor, no sheen, damp	NA	NA
		9-12	Silt, odor, moist	NA	NA
			Total Depth = 12 feet below grade surface		
			Moist soil encountered at ~9 feet below grade surface, groundwater not encountered.		
TP-1	06/02	0-1	Gravel/rock	136	Submitted at sand/silt contact.
		1-5	Brown sand		
		5-6	Gray sandy silt		
			Total Depth = 6 feet below grade surface		
			Groundwater encountered at ~5.5 feet below grade surface. Sheen on groundwater.		
TP-2	06/02	0-1	Rock, gravel, sand, geotextile from Holbrook	NA	NA
			Trench recovery system		
			Total Depth = 1 feet below grade surface		
			Groundwater not encountered.		
TP-3	06/02	0-1.5	Rock, brown sand, electrical conduit for Holbrook	NA	NA
			Slough recovery system		
			Total Depth = 1.5 feet below grade surface		
			Groundwater not encountered.		

**APPENDIX A**  
**SUMMARY OF HISTORIC BORING AND TEST PIT LOGS**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Exploratory Boring or Test Pit ID	Date	Depth (feet)	Soil Description	Photo-Ionization Detector Reading (ppm)	Sample Collection
TP-4	06/02	0-1	Gravel/rock		Submitted at sand/silt contact.
		1-4.9	Brown sand		
		4.9-5.5	Green/gray silt	0	
			Total Depth = 5.5 feet below grade surface		
			Groundwater encountered at ~5.5 feet below grade surface. No sheen on groundwater.		
TP-5	06/02	0-1	Gravel/rock		Submitted at sand/silt contact.
		1-5.6	Brown sand		
		5.6-6	Green/gray silt	0	
			Total Depth = 6 feet below grade surface		
			Groundwater encountered at ~5.6 feet below grade surface. No sheen on groundwater.		
TP-6	06/02	0-1	Gravel/rock		Submitted at sand/silt contact.
		1-5.5	Brown sand		
		5.5-6	Green/gray silt	250	
			Total Depth = 6 feet below grade surface		
			Groundwater encountered at ~5.5 feet below grade surface. Slight sheen on groundwater.		
TP-7	06/02	0-1	Gravel/rock		Submitted at sand/silt contact.
		1-5.5	Brown sand		
		5.5-6	Green/gray silt	182	
			Total Depth = 6 feet below grade surface		
			Groundwater encountered at ~5.5 feet below grade surface. Sheen on groundwater.		
TP-8	06/02	0-1	Gravel/rock		Submitted from impacted sand.
		1-7	Coarse, dark gray sand and gravel	55	
			Total Depth = 7 feet below grade surface		
			Groundwater encountered at ~5.5 feet below grade surface. Sheen on groundwater, good recharge.		
			Wood in pit.		
TP-9	06/02	0-1	Gravel/rock		NA
		1-6	Gray sand and gravel	15	
			Total Depth = 6 feet below grade surface		
			Groundwater encountered at ~5.5 feet below grade surface. Sheen on groundwater, good recharge.		
			Broken pieces of clay sewer pipe in pit.		
TP-10	06/02	0-1	Gravel/rock		NA
		1-3.5	Brown sand		
		3.5-6	Green/gray silt	125	
			Total Depth = 6 feet below grade surface		
			Groundwater not encountered.		

**APPENDIX A**  
**SUMMARY OF HISTORIC BORING AND TEST PIT LOGS**  
Chevron Willbridge Distribution Center  
Portland, Oregon

Exploratory Boring or Test Pit ID	Date	Depth (feet)	Soil Description	Photo-Ionization Detector Reading (ppm)	Sample Collection
TP-11	06/02	0-1	Gravel/rock		NA
		1-5	Brown sand		
		5-6	Green/gray silt	140	
			Total Depth = 6 feet below grade surface		
			Groundwater not encountered.		
TP-12	06/02	0-1	Gravel/rock		NA
		1-4	Brown sand		
		4-6	Green/gray silt	166	
			Total Depth = 6 feet below grade surface		
			Groundwater not encountered.		
TP-13	06/02	0-1	Gravel/rock		NA
		1-7	Brown sand		
		7-8	Green/gray silt	13	
			Total Depth = 8 feet below grade surface		
			Groundwater not encountered.		
			Wood in pit in sand at ~5.5 feet, not a sewer pipe, organic odor		

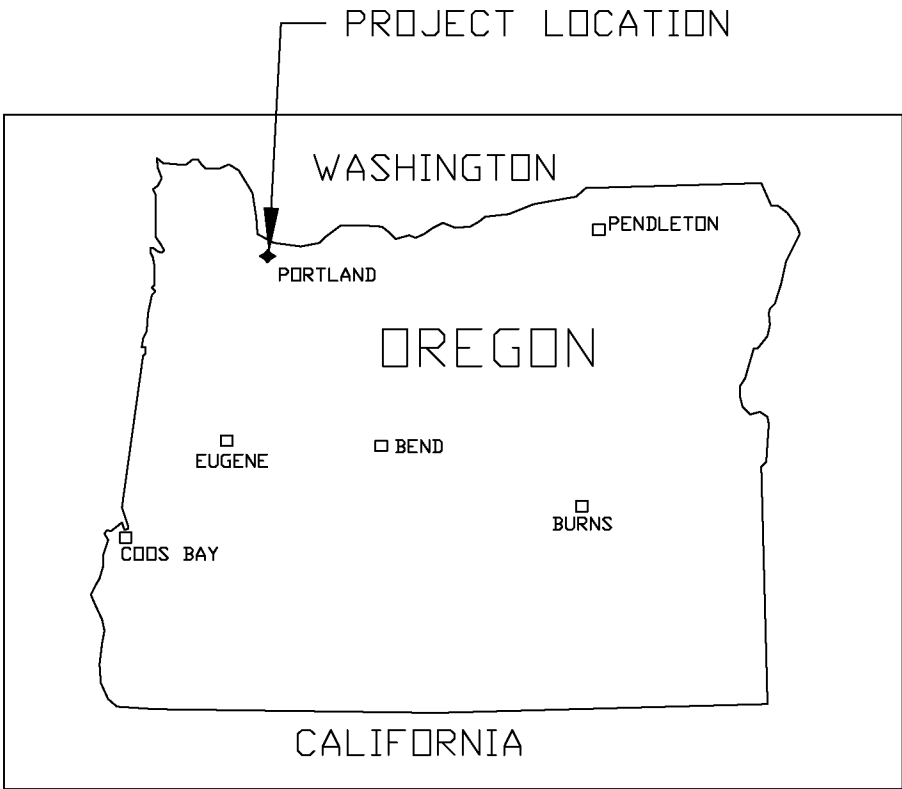
Notes:

\*PID = Photo Ionization Detector

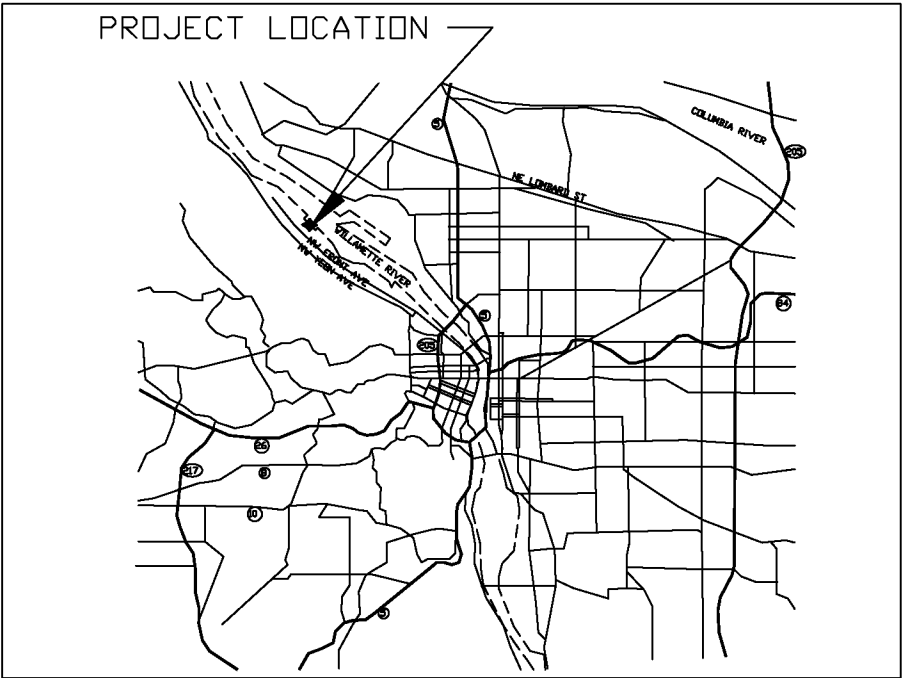
ppm = parts per million

NA = Not available or not applicable

Exploratory test pits or borings completed by either KHM Environmental or Delta Environmental.



VICINITY MAP  
NOT TO SCALE



SITE MAP  
NOT TO SCALE

INDEX OF DRAWINGS

DRAWING	SHEET
TITLE SHEET	1
PROJECT NOTES	2
PROJECT LOCATION MAP	3
EXISTING SITE FEATURES	4
SITE PLAN	5
SHEET PILE CROSS-SECTION ALONG ALIGNMENT OF CUTOFF WALL	6
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CUTOFF WALL COLLECTION TRENCH DETAILS	8
GRADING PLAN	9
EROSION CONTROL PLAN	10

CAUTION NOTICE TO CONTRACTOR

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS ARE BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY IN ADVANCE BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.

CONSTRUCTION DRAWINGS FOR  
CHEVRON AND CONOCO PHILLIPS WILLBRIDGE TERMINAL GROUNDWATER CUTOFF WALL  
PORTLAND, OREGON

2	2/25/03	Wall design update, February 2003		XREF(S) USED: _____	DESIGNED BY BJB	DATE APPD.		 <b>ENGINEERING, INC.</b> Engineers • Land Surveyors • Environmental Scientists 31960 SW CHARBONNEAU DR., SUITE 101 WILSONVILLE, OREGON 97070 (503)694-6960	TITLE SHEET PROPOSED CUTOFF WALL WILLBRIDGE FORMER 27-INCH STORM SEWER AREA NW Front & NW Doane Avenue	1/4 SECTION 2423
3		Wall design update, March 2003		ROTATION ANGLE: _____	DRAWN BY CCA	PROGRAM MGR				JOB NO. 02-299
4	8/22/03	Wall design change, August 2003		CONSTRUCTED BY _____	CHECKED BY	CONST. MGR.				SHEET NO.
5	10/23/03	Wall design change, October 2003		PROJECT COMPLETED _____						
				MAP CORRECTED BY _____ CHECKED BY _____						
				FINAL MAP DATA	DESIGN MGR.					
NO.	DATE	DESCRIPTION	APPD.							
		REVISION								



GENERAL PROJECT NOTES

- 1) Contractor shall notify Bureau of Environmental Services at (503) 823-7931 two (2) business days prior to commencement of work.
- 2) All construction shall conform to City of Portland standard construction specifications, as revised in 1998. Contractor and/or subcontractor shall have a minimum of one set of approved plans and City of Portland standard construction specifications on the job site at all times during construction.
- 3) Office of Planning and Development Review, Approvals, and Permits required for privately maintained structures constructed. All work approved under OPDR permits shall be privately owned and maintained.
- 4) Attention Excavators: Oregon law requires you to follow rules adopted by Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. You may obtain copies of those rules from the Center by calling (503)232-1987. If you have any questions about the rules, you may contact the Center. You must notify the Center at least two (2) business days, but not more than ten (10) business days, before commencing an excavation. Call 503-246-6699.
- 5) Slope stability evaluation to be completed prior to any disturbance of existing slope on Chevron property.
- 6) Excavated trench spoil material shall be disposed of at a proper landfill, or applicant shall obtain a fill permit from the Office of Planning and Development Review before being disposed of on-site. A copy of the grading permit and plan should also be provided to the Bureau of Environmental Services for construction inspection.
- 7) Site erosion plan to be approved and controls in place prior to construction. All work under this permit will require site erosion control in compliance with all provisions of the City Title 10.

ADDITIONAL PROJECT NOTES

SHEET PILE WALL

- 1) Sheet Piling to be Hoesch H-1700 Steel Sheet Piling or equivalent, as approved by Engineer and Client.
- 2) Sheet Piling joints to include waterstop seals. Waterstop seals shall be ADEKA ULTRA SEAL A-50 or equivalent as approved by Engineer and Client.
- 3) Sheet Piling and waterstop seals to be installed consistent with manufacturers' recommendations.

COLLECTION TRENCH

- 1) Trench sand backfill shall be medium to coarse sand, moderately graded. The sand shall be free of silt, clay, loam, friable or soluble materials, or organic matter, conforming to the following gradation (or other as approved by Engineer and Client):

Sieve Size	Percent Passing
No. 4	100
No. 10	10 to 100
No. 40	0 to 10
No. 200	0

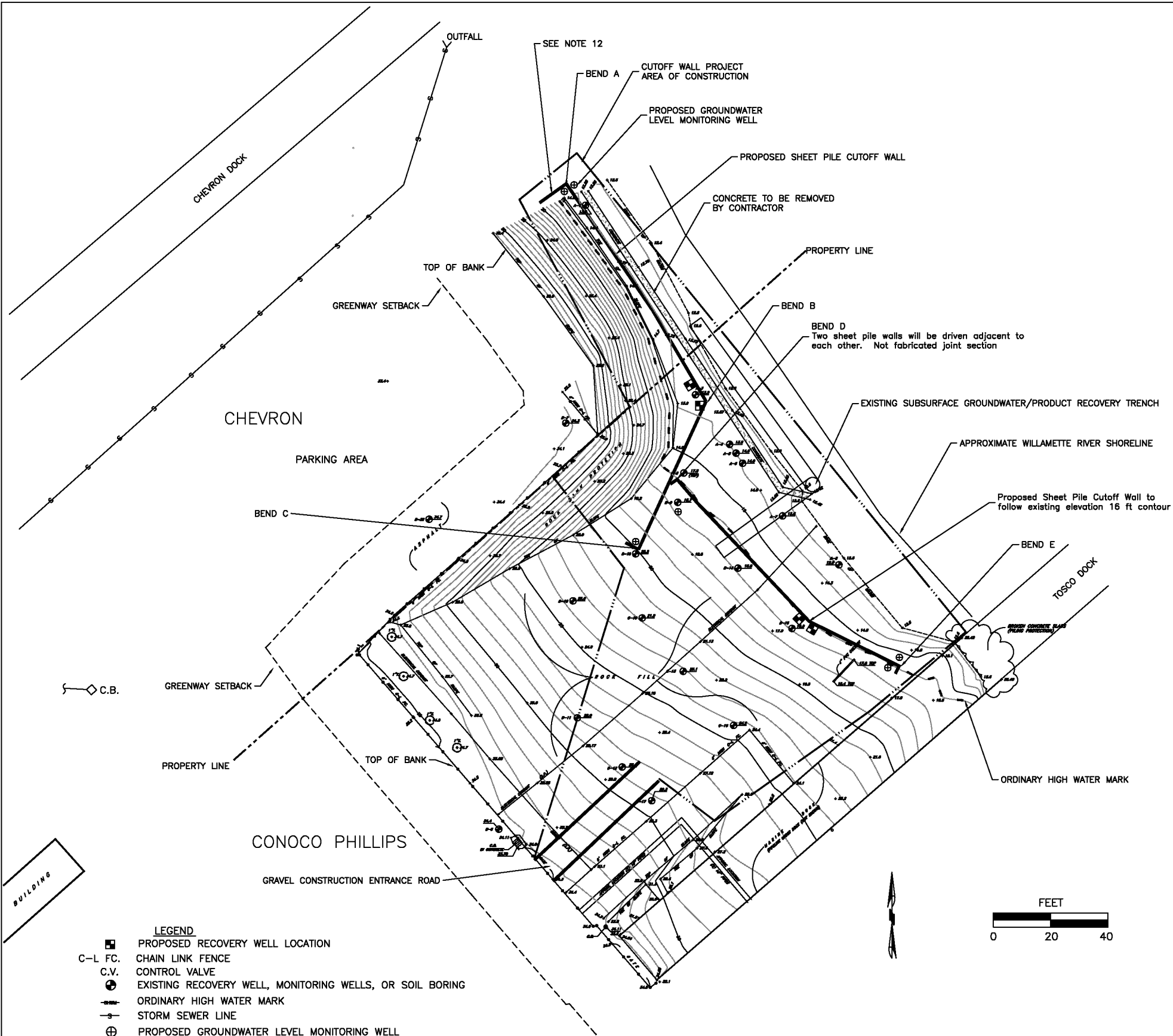
- 2) Geotextile Fabric separating sand and rip rap shall be non-woven fabric that complies with the following properties (unless otherwise approved by Engineer and Client):

Test	Method	Value
Grab Tensile Strength (N)	ASTM D4632	1155
Burst Strength (KPa)	ASTM D3786 Mod.	3000
Puncture Strength (N)	ASTM D4833 or ASTM D3787 Mod.	490
Apparent Opening Size (uM)	ASTM D4751	212
Ultraviolet Stability	ASTM D4355 @500 hrs	70% Strength retained

2	2/25/03	Wall design update, February 2003		XREF(S) USED: _____	DESIGNED BY BJB	DATE APPD.		 <b>ENGINEERING, INC.</b> <small>Engineers • Land Surveyors • Environmental Scientists 31980 SW CHARBONNEAU DR., SUITE 101 WILSONVILLE, OREGON 97070 (503)894-6980</small>	PROJECT NOTES PROPOSED CUTOFF WALL WILLBRIDGE FORMER 27-INCH STORM SEWER AREA NW Front & NW Doane Avenue	1/4 SECTION 2423
3		Wall design update, March 2003		ROTATION ANGLE: _____	DRAWN BY CCA	PROGRAM MGR				JOB NO. 02-299
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				MAP CORRECTED BY _____ CHECKED BY _____						
				FINAL MAP DATA	DESIGN MGR.					
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		REVISION								



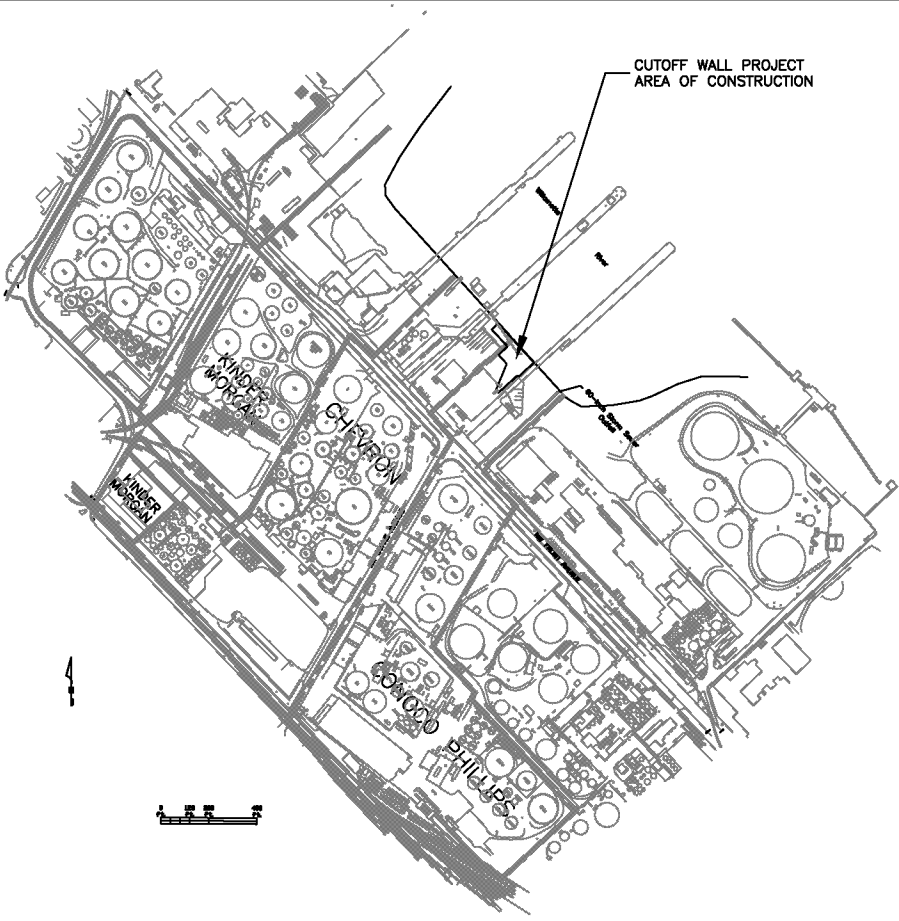




NOTES

1. BENCH MARK: CITY OF PORTLAND B.M. NO 2528. ELEVATION 34.64
2. CONTOURS ARE AT ONE-FOOT INTERVALS AND ARE COMPUTER GENERATED.
3. CONTOURS MAP ADAPTED FROM FIGURE PROVIDED BY CHASE, JONES, AND ASSOCIATES DATED MAY 29, 2002.
4. UNDERGROUND UTILITIES ARE SUBJECT TO ACTUAL FIELD LOCATION.
5. ALL UTILITIES MAY NOT BE SHOWN.
6. 4% OF SITE COVERED BY ROOFED STRUCTURES.
7. NO ACCESSORY BUILDINGS LOCATED ON-SITE.
8. 0% OF SITE CURRENTLY LANDSCAPED.
9. SITE PART OF TOSCO OIL COMPANY SHIPPING / RECEIVING DOCK.
10. ORDINARY HIGH WATER MARK IS 16 FT ABOVE MSL.
11. NO TREES IN AREAS TO BE DISTURBED.
12. SLOPE STABILITY EVALUATION TO BE COMPLETED PRIOR TO ANY DISTURBANCE OF EXISTING SLOPE ON CHEVRON PROPERTY.

SITE LOCATION INSERT



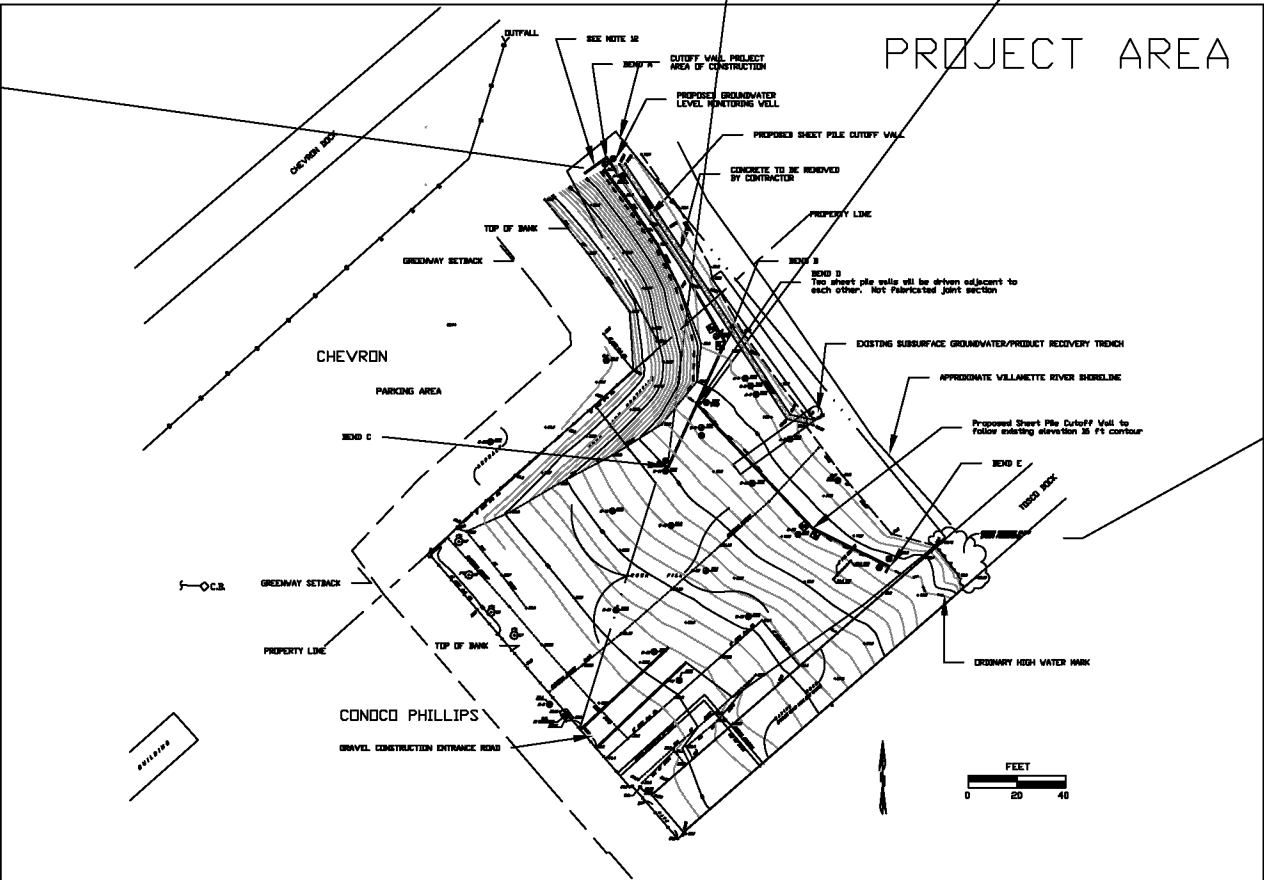
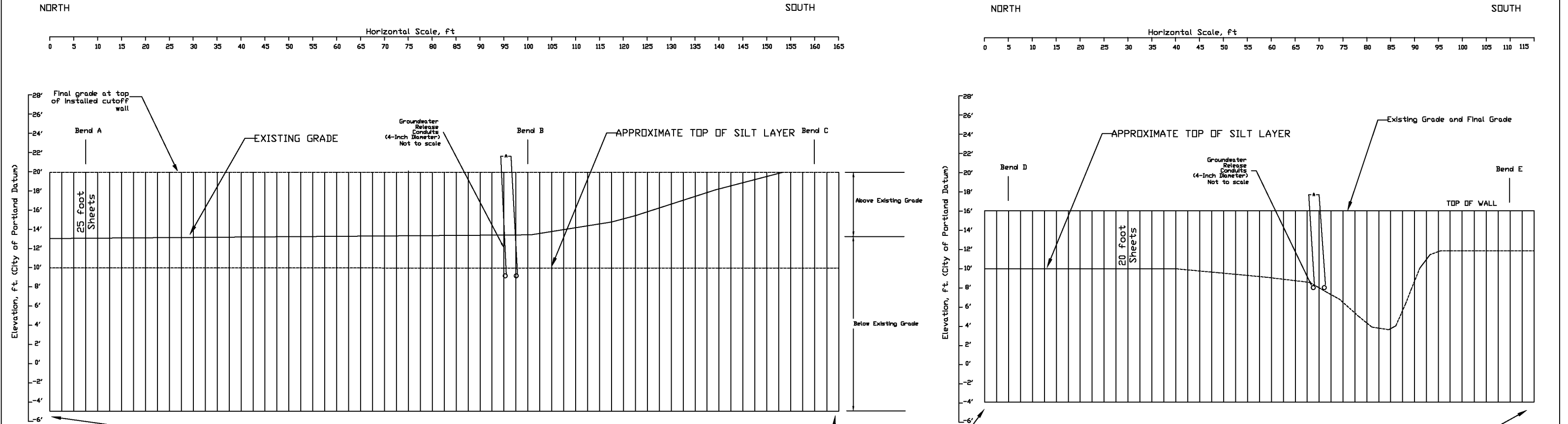
- LEGEND
- PROPOSED RECOVERY WELL LOCATION
  - C-L FC. CHAIN LINK FENCE
  - C.V. CONTROL VALVE
  - EXISTING RECOVERY WELL, MONITORING WELLS, OR SOIL BORING
  - ORDINARY HIGH WATER MARK
  - STORM SEWER LINE
  - PROPOSED GROUNDWATER LEVEL MONITORING WELL

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3		Wall design update, March, 2003		ROTATION ANGLE	BJB	
4	8/22/03	Wall design change, August 2003		CONSTRUCTED BY	DRAVN BY	PROGRAM MGR
5	10/23/03	Wall design change, October 2003		PROJECT COMPLETED	CCA	
6	8/26/04	Design change, August 2004		MAP CORRECTED BY	CHECKED BY	CONST. MGR.
				CHECKED BY		
				DESIGN MGR.		
NO.	DATE	DESCRIPTION	APPD.	FINAL MAP DATA		
		REVISION				

**RSV**  
**ENGINEERING, INC.**  
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WILSONVILLE, OREGON 97070 (503)694-6960

SITE PLAN  
WILLBRIDGE FORMER 27-INCH STORM SEWER AREA  
NW Front Ave & NW Doane  
PLAN VIEW

1/4 SECTION  
2423  
JOB NO.  
02-158  
SHEET NO.  
5 of 10



2	2/25/03	Wall design update, February, 2003		XREF(S) USED:	DESIGNED BY	DATE APPD.						1/4 SECTION
3		Wall design update, March 2003		ROTATION ANGLE:	BJB							2423
4	8/22/03	Wall design change, August 2003			DRAWN BY	PROGRAM MGR						JOB NO.
5	10/23/03	Wall design change, October 2003		CONSTRUCTED BY	CCA							02-158
6	8/28/04	Wall design change, August 2004		PROJECT COMPLETED	CHECKED BY	CONST. MGR.						SHEET NO.
				MAP CORRECTED BY	CHECKED BY							6 of 10
				FINAL MAP DATA	DESIGN MGR.							
NO.	DATE	DESCRIPTION	APPD.									
REVISION												

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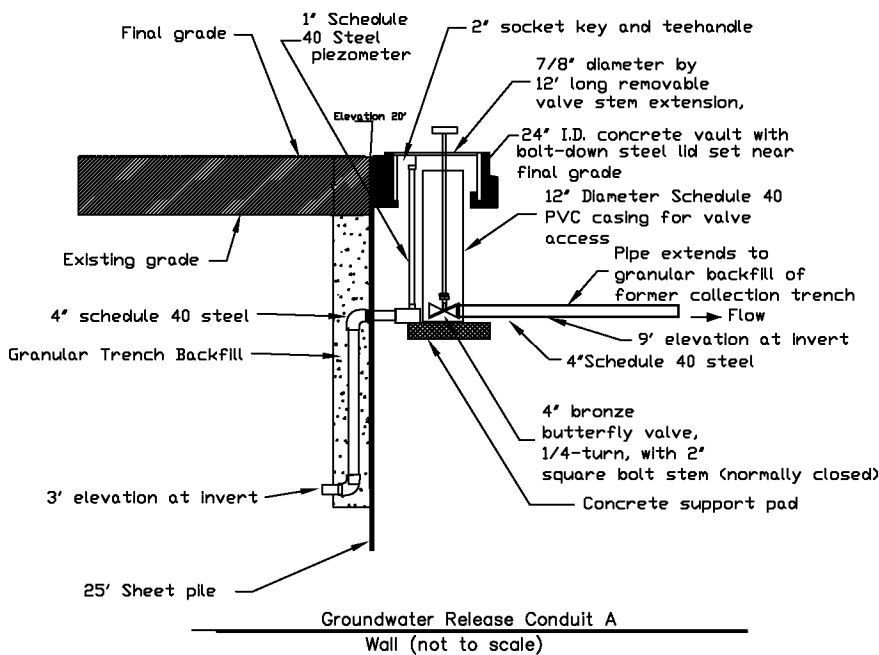
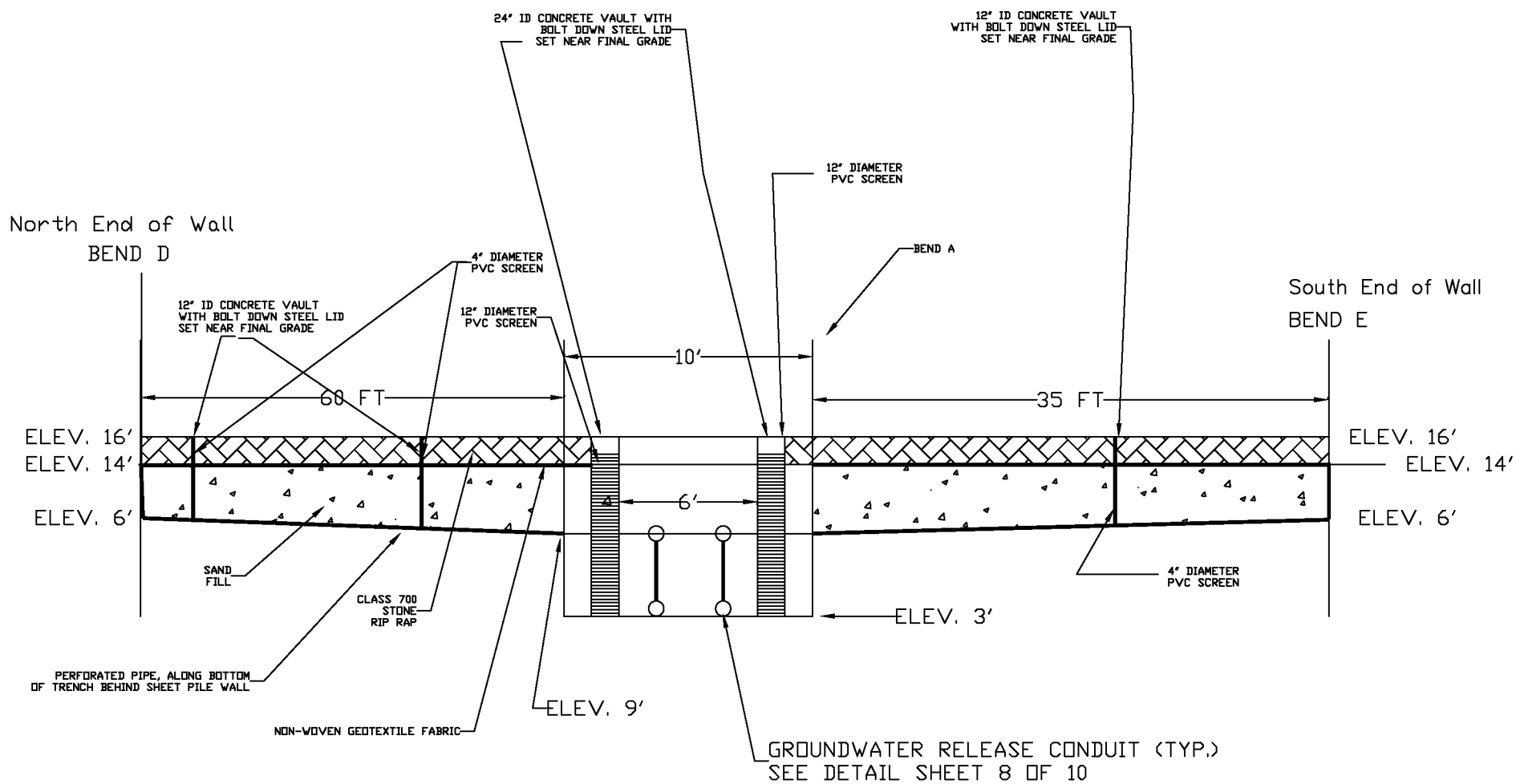
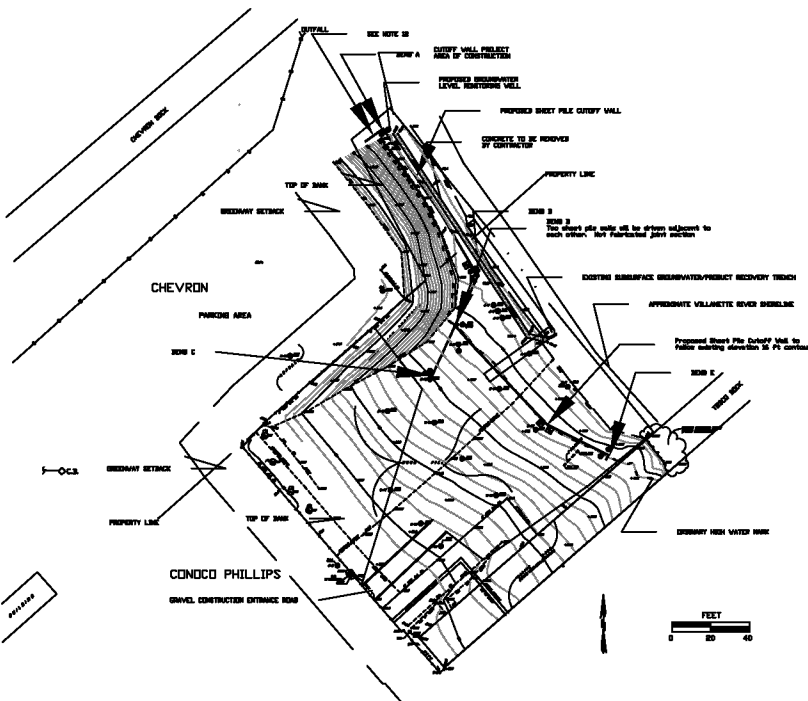
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WILSONVILLE, OREGON 97070 (503)894-8960

SHEET PILE CROSS SECTION  
ALONG ALIGNMENT OF CUTOFF WALL  
PROPOSED CUTOFF WALL  
WILLBRIDGE FORMER 27-INCH STORM SEWER AREA  
NW Front Ave & NW Doane





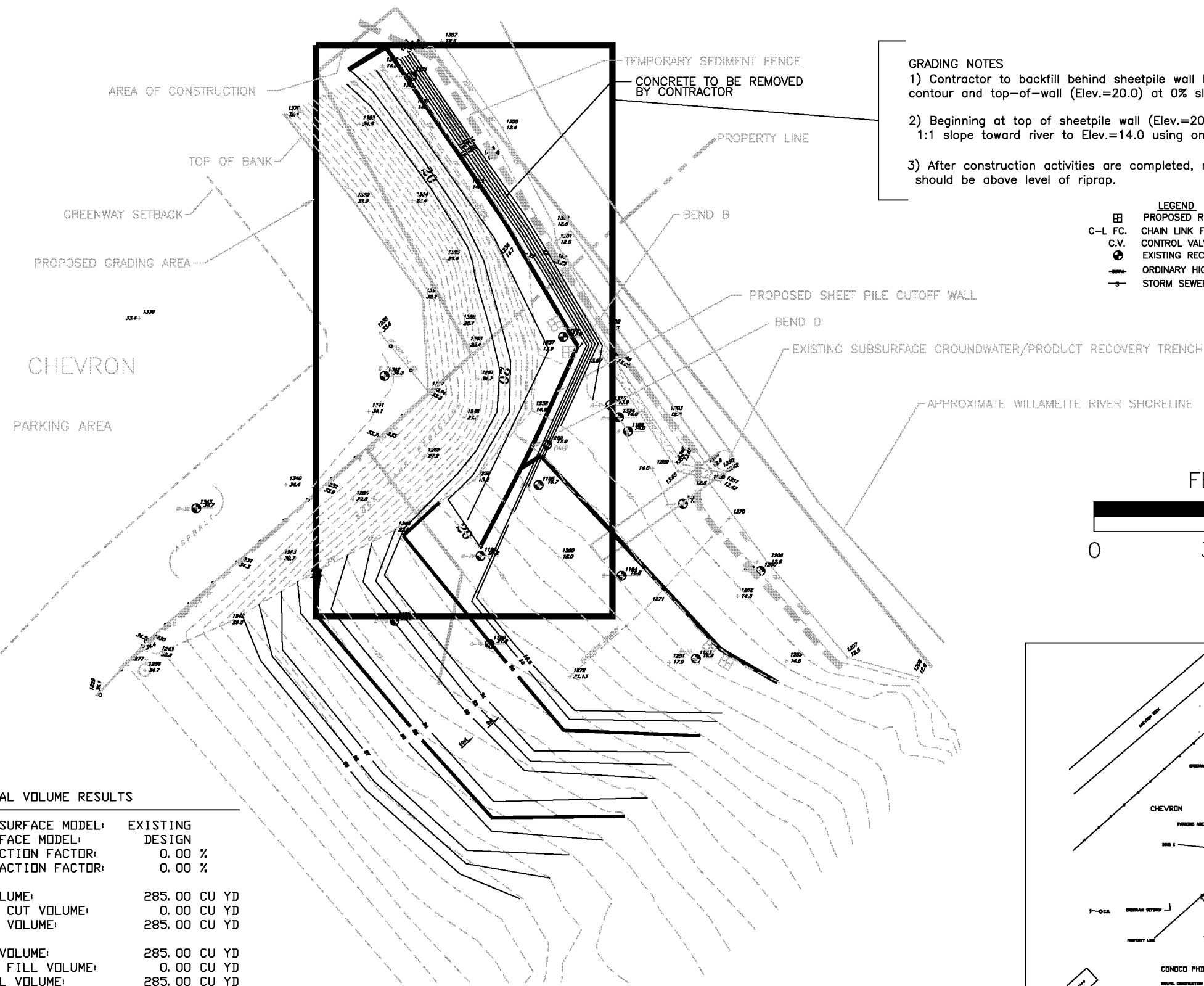
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3		Wall design update, March 2003		ROTATION ANGLE:	BJB	
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5	8/26/04	Design change, August 2004		PROJECT COMPLETED	CCA	
				MAP CORRECTED BY	CHECKED BY	CONST. MGR.
				CHECKED BY		
				FINAL MAP DATA	DESIGN MGR.	
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CUTOFF WALL COLLECTION TRENCH DETAILS  
WILLBRIDGE FORMER 27-INCH  
STORM SEWER AREA  
NW Front Ave & NW Doane

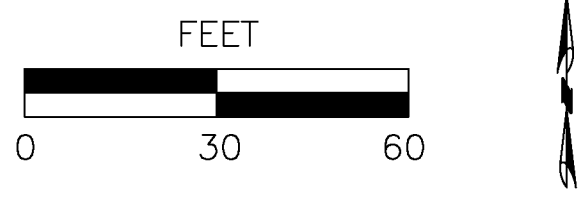
1/4 SECTION  
2423  
JOB NO.  
02-158  
SHEET NO.  
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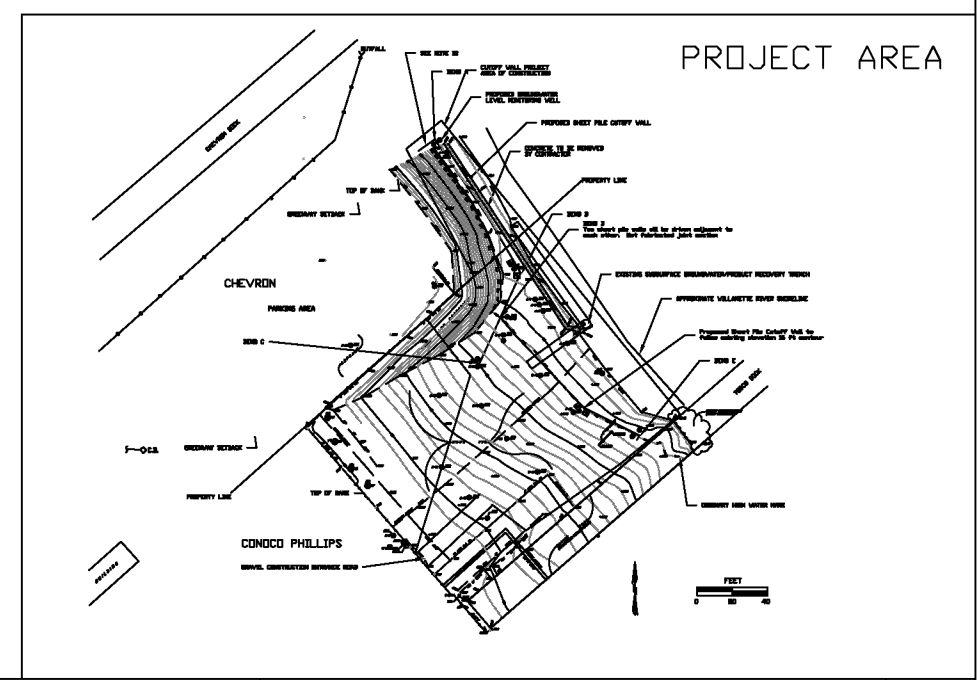
- GRADING NOTES**
- 1) Contractor to backfill behind sheetpile wall between Elev.=20.0 contour and top-of-wall (Elev.=20.0) at 0% slope with onsite riprap.
  - 2) Beginning at top of sheetpile wall (Elev.=20.0), Contractor to construct 1:1 slope toward river to Elev.=14.0 using onsite riprap.
  - 3) After construction activities are completed, no section of sheet pile wall should be above level of riprap.

- LEGEND**
- PROPOSED RECOVERY WELL LOCATION
  - C-L FC. CHAIN LINK FENCE
  - C.V. CONTROL VALVE
  - EXISTING RECOVERY WELL, MONITORING WELLS, OR SOIL BORING
  - ORDINARY HIGH WATER MARK
  - STORM SEWER LINE



**PRISMOIDAL VOLUME RESULTS**

ORIGINAL SURFACE MODEL:	EXISTING
FINAL SURFACE MODEL:	DESIGN
CUT COMPACTION FACTOR:	0.00 %
FILL COMPACTION FACTOR:	0.00 %
RAW CUT VOLUME:	285.00 CU YD
COMPACTED CUT VOLUME:	0.00 CU YD
TOTAL CUT VOLUME:	285.00 CU YD
RAW FILL VOLUME:	285.00 CU YD
COMPACTED FILL VOLUME:	0.00 CU YD
TOTAL FILL VOLUME:	285.00 CU YD



2	2/25/03	Wall design update, February, 2003		XREF(S) USED:	DESIGNED BY	DATE APP'D.	
3		Wall design update, March 2003		ROTATION ANGLE:	BJB		
4	8/22/03	Wall design change, August 2003			DRAWN BY	PROGRAM MGR	
5	10/23/03	Wall design change, October 2003		CONSTRUCTED BY:	CCA		
6	08/26/04	Design change, August 2004		PROJECT COMPLETED:	CHECKED BY	CONST. MGR.	
7	09/22/04	Grading Plan modification, September 2004		MAP CORRECTED BY: _____	CHECKED BY:		
8	12/10/04	Grading Plan modification, December 2004		FINAL MAP DATA	DESIGN MGR.		
NL	DATE	DESCRIPTION	APPR.				
		REVISION					

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WILSONVILLE, OREGON 97070 (503) 694-6960

GRADING PLAN  
PROPOSED CUTOFF WALL  
WILLBRIDGE FORMER 27-INCH STORM SEWER AREA  
NW Front Ave & NW Doane  
PLAN VIEW

1/4 SECTION  
2423  
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